The RUBBER AGE

February, 1948

ULTRA ACCELERATORS

Over the past 25 years Vanderbilt has steadily pioneered the development of a most complete line of ULTRA accelerators...These are used to advantage both as primaries and as secondaries. Some even act as vulcanizing agents.

METHYL TUADS the original member, continues to be the best seller.

CUMATE is most outstanding for GR-S compounds.

TELLURAC *plus* **METHYL TUADS** is best in GR-I.

Vanderbilt ULTRAS, 9 in number, are now being produced in 4 plants, a distinct assurance of service.

R. T. VANDERBILT CO., Inc.

230 Park Avenue, New York 17, N. Y.

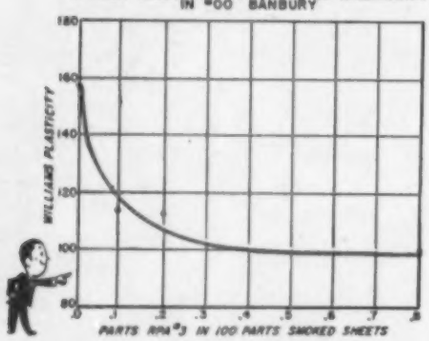
Du Pont RPA NO. 3

Photograph courtesy of Farrel Birmingham Inc.

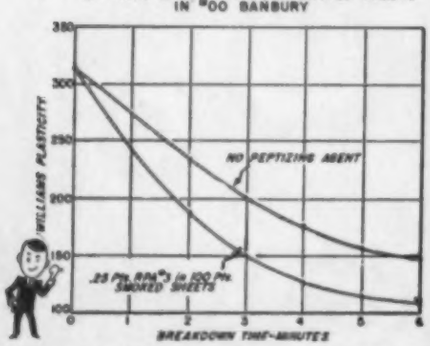
CAN

INCREASE YOUR BANBURY CAPACITY...

EFFECT OF CONCENTRATION OF RPA 3 ON WILLIAMS PLASTICITY OF 1800 GRAM BATCH OF SMOKED SHEETS AFTER 6 MINUTES BREAKDOWN IN "00 BANBURY



EFFECT OF BREAKDOWN TIME ON PLASTICITY OF 1800 GRAM BATCH OF SMOKED SHEETS IN "00 BANBURY



Check these advantages:

- **Shortens Breakdown Time**
- **Reduces Breakdown Costs**
- **Improves Processing Quality of Rubber Stocks**

Tune in to Du Pont "Cavalcade of America," Monday Nights—8 p. m. EST, NBC

DU PONT RUBBER CHEMICALS

E. I. du Pont de Nemours & Co., (Inc.), Wilmington 98, Del.

BETTER THINGS FOR BETTER LIVING ...THROUGH CHEMISTRY

DU PONT

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FEB 26 1948
DETROIT

TWO NEW HYCAR AMERICAN RUBBERS

Hycar OR-25 EP *(Easy Processing)*
Hycar OR-25 NS *(Non-Staining)*

HERE are two new American rubbers, both with superior processing characteristics. Hycar NS and Hycar EP differ only in that a special anti-oxidant has been used in the NS, making it non-staining and non-discoloring. This is an outstanding quality, particularly desirable in the fabrication of light colored products. The new Hycar rubbers have all these advantages over the regular process Hycar OR-25:

1. They band on the processing mill speedily—cut mill mixing time.
2. Better extrusion characteristics—less nerve and less heat build-up.
3. Excellent high temperature mixing.
4. Better fusion and mold flow characteristics.
5. Increased building tack for laminated products, such as frictioned stocks and calendered sheeting.

Both rubbers retain those properties which make Hycar American rubbers so usable for so many products . . . permanent resiliency and superior resistance to oil, abrasion, and aging. Ask your supplier for parts made from Hycar. Or write to Dept. HB-2. B. F. Goodrich Chemical Company, Rose Building, Cleveland 15, Ohio.

Hycar
Reg. U. S. Pat. Off.
American Rubber

B. F. Goodrich Chemical Company
A DIVISION OF THE B. F. GOODRICH COMPANY

GEON polyvinyl materials • HYCAR American rubber • KRISTON thermosetting resins • GOOD-RITE chemicals

Roses are Red, Violets are Blue, Philblack O is Great Stuff, too!

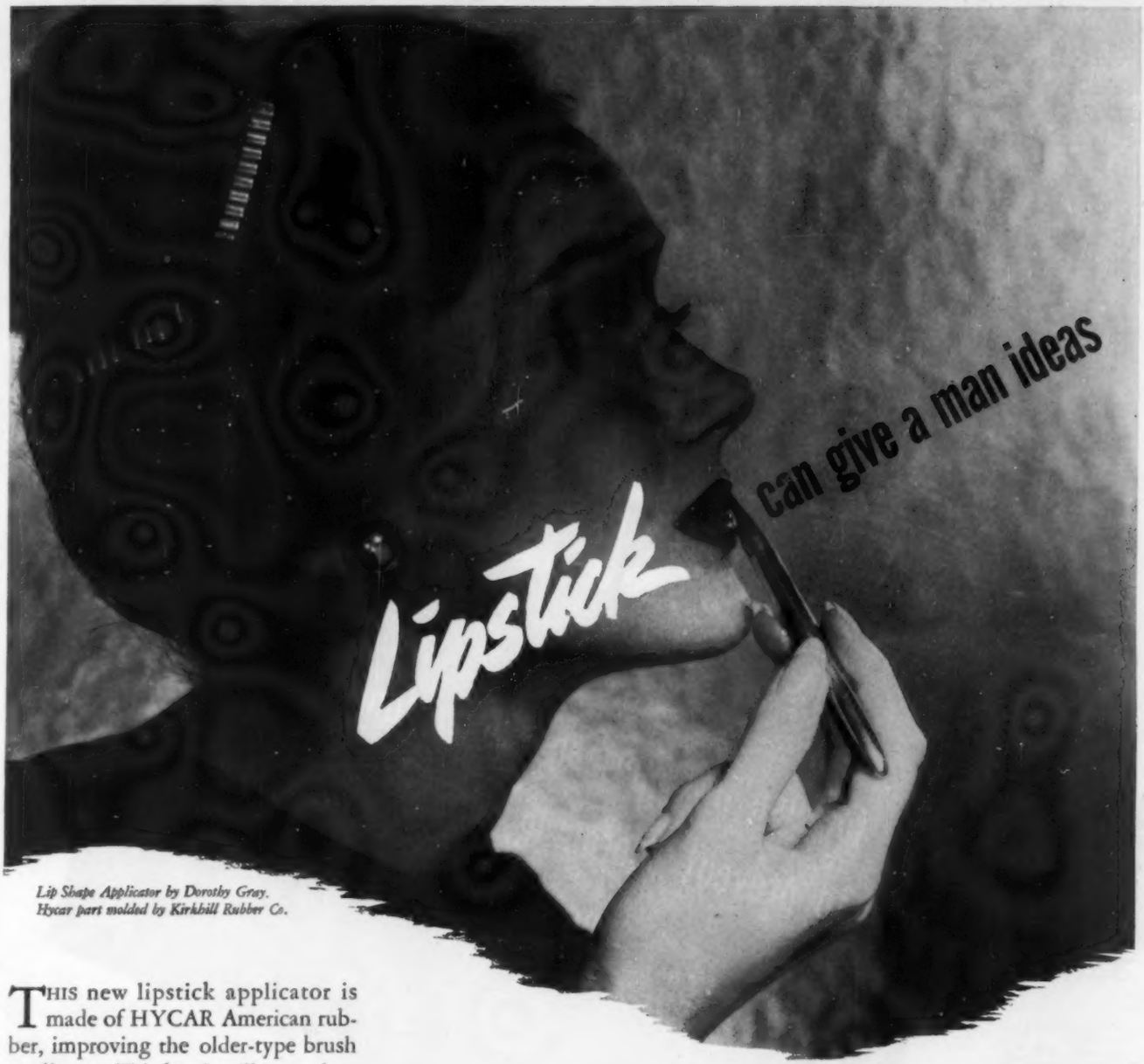
YOU'LL LOVE PHILBLACK O, the HAF (high abrasion furnace) black that gives rubber products excellent resistance to abrasion. In addition your products will have a long flex-life with a minimum of cut and crack growth!

Use Philblack O once and you'll love him forever! We can give you convincing statistics to prove this (just write for the results of laboratory tests on Philblack O) but the best way to find out, is to put it into production now.

PHILLIPS PETROLEUM COMPANY

Rubber Chemicals Division

EVANS SAVINGS AND LOAN BUILDING · AKRON 8, OHIO



Lip Shape Applicator by Dorothy Gray.
Hycar part molded by Kirkhill Rubber Co.

THIS new lipstick applicator is made of HYCAR American rubber, improving the older-type brush applicator. This brush will never lose its bristles!

The designer had an idea—and from his idea may grow others for improving products or creating new ones. Certain definite characteristics of HYCAR met perfectly the requirements for the lipstick applicator. The tip is flexible, and is resistant to grease and oils. Unlike many types of rubber it takes well to color, brilliant or delicate. And finally, it is easy to process. Even in very small molds such as the one used for this product the work can be precise, craftsmanlike, and beautiful.

Versatile HYCAR American rubber has many qualities which make it desirable throughout industry. Latices of HYCAR may be used as impregnants for paper or cloth —or as adhesives in a wide range of applications. Its resistance to heat and cold, weather and wear, mean that it is among the most versatile of modern products.

We make no finished products from HYCAR—or from other B. F. Goodrich Chemical Company raw materials. However, we'll be glad to work with you on any special problems or applications. For more information, write B. F. Goodrich Chemical Company, Dept. R-2, Rose Building, Cleveland 15, Ohio. In Canada: Kitchener, Ontario.

Hycar
Reg. U.S. Pat. Off.
American Rubber

B. F. Goodrich Chemical Company
A DIVISION OF THE B. F. GOODRICH COMPANY

GEON polyvinyl materials • HYCAR American rubber • KRISTON thermosetting resins • GOOD-RITE chemicals

Good-rite
VULTROL
for use in American rubber compounding
to prevent scorching, and for recovering
scorched stocks
GOOD-RITE AND VULTROL REG. T.M. U.S. PAT. OFF.

For technical data please write Dept. CB-2

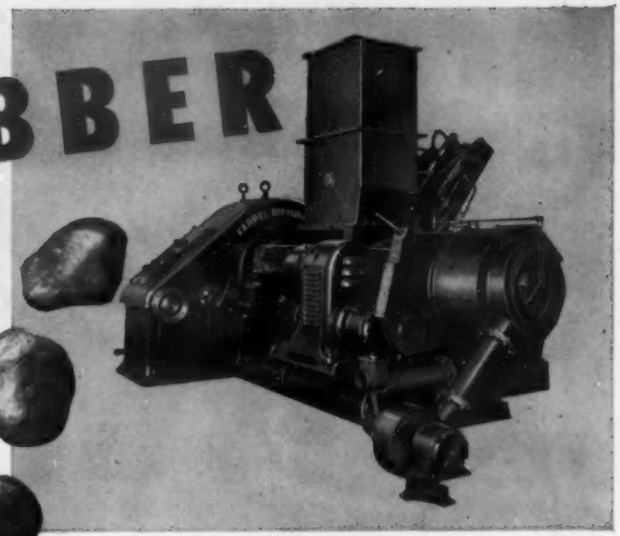
B. F. Goodrich Chemical Company

A DIVISION OF THE B. F. GOODRICH COMPANY

ROSE BUILDING, CLEVELAND 15, OHIO

GEON polyvinyl materials • HYCAR American rubber • KRISTON thermosetting resins • GOOD-RITE chemicals

6 WAYS THAT PELLET RUBBER STEPS UP MILL ROOM EFFICIENCY



Here's a machine that, by transforming bulky, hard-to-handle rubber into small, free-flowing pellets, makes possible lower-cost, higher-efficiency mill-room layouts such as the one shown in the diagram.

Here are six processing advantages that you get from a pellet rubber system:

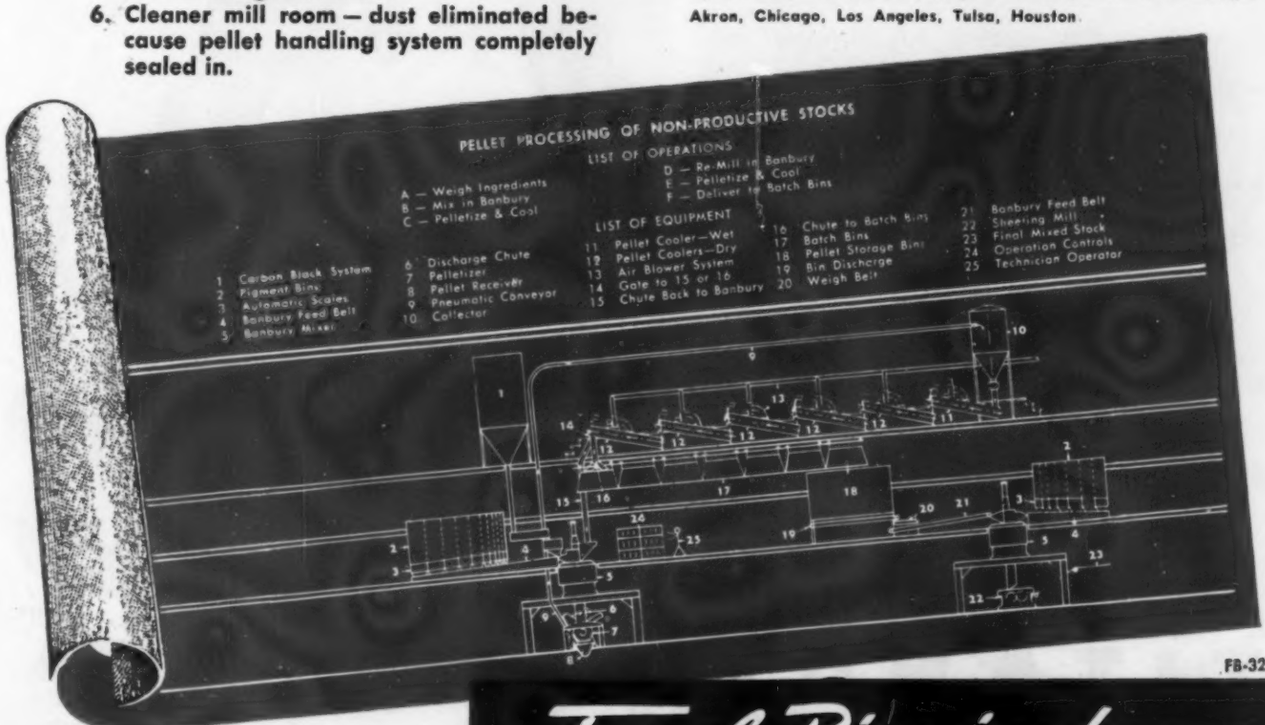
1. **Manual handling reduced by automatic conveying, weighing and mixing.**
2. **Increased production—Banbury mixing cycle reduced.**
3. **Greater ease of mixing and blending rubber pellets improves uniformity and quality of finished product.**
4. **Pellets thoroughly cooled more quickly—reduces time between processing operations—less stock in process.**
5. **Less floor space required — floor storage and trucking eliminated.**
6. **Cleaner mill room — dust eliminated because pellet handling system completely sealed in.**

The Hale Pelletizer itself is an extruding machine with a screw which forces the rubber up to the pelletizing head where the pellets are formed. These pellets are lightly coated with soapstone before leaving the machine to prevent sticking together.

You can get complete information and engineering help on the pelletizer and pellet rubber system by sending us a request on your letterhead. No obligation, of course.

FARREL-BIRMINGHAM COMPANY, INC.
ANSONIA, CONNECTICUT

Plants: **Ansonia and Derby, Conn., Buffalo, N. Y.**
Sales Offices: **Ansonia, Buffalo, New York, Boston, Pittsburgh, Akron, Chicago, Los Angeles, Tulsa, Houston.**



FB-323

Farrel-Birmingham

TITANOX ... *the brightest name in titanium pigments*

Add "White Magic" to your products

When a rubber product, such as a bathing suit, is made with TITANOX pigments, it's sure to have lasting whiteness and brightness. Not only are these qualities imparted in great measure by these versatile titanium dioxide pigments, but also maximum opacity is contributed to rubber products of all kinds.

Although the makers of TITANOX are pushing production to full capacity to meet the growing demand for these pigments, the supply still is not great enough to fill all orders. However, we may be able to help you get the most out of your available supply. Our Technical Service Laboratory — reached through our nearest office — will be glad to help you.

6313

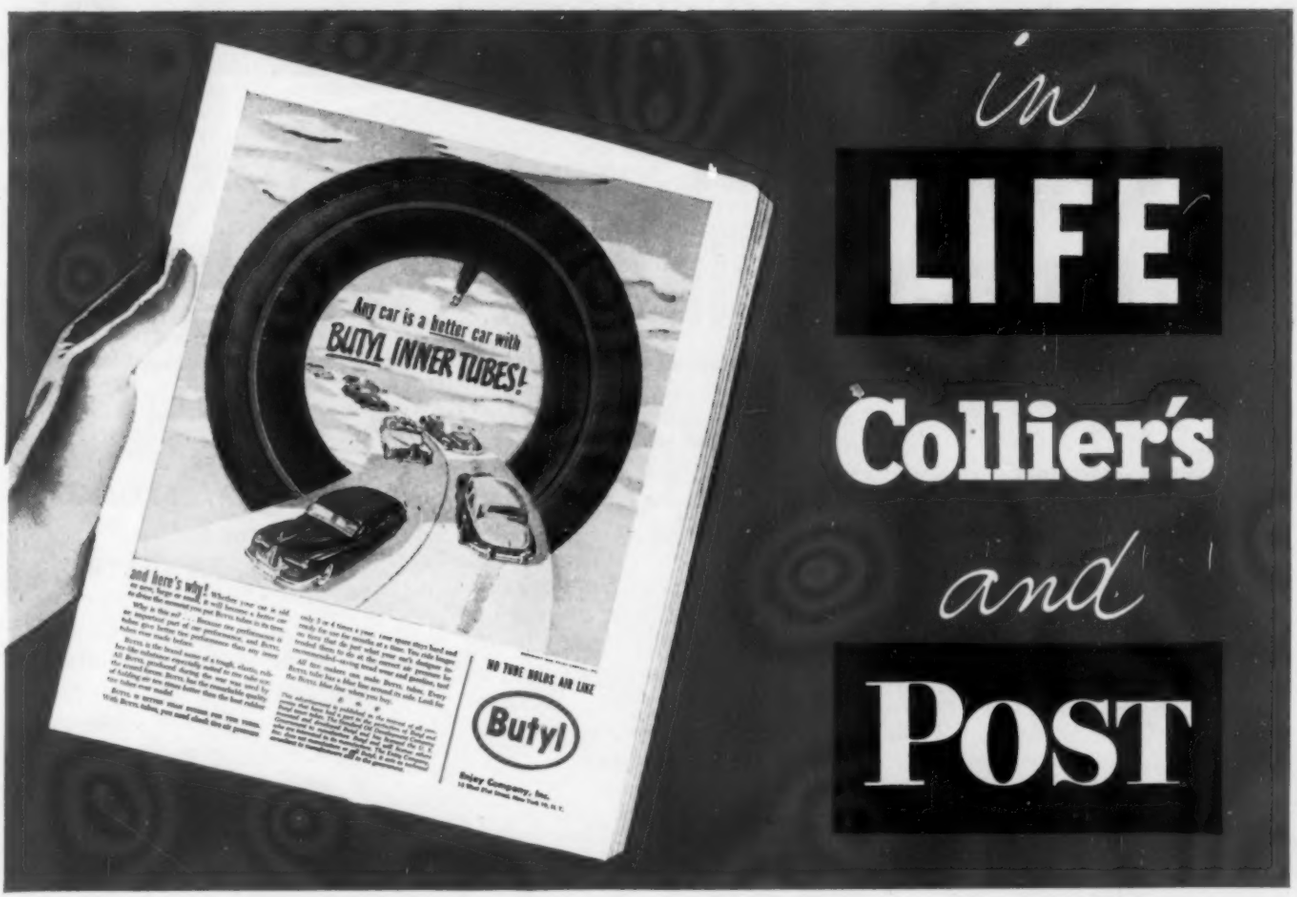
TITANOX

Reg. U. S. Pat. Off.

TITANIUM PIGMENT CORPORATION
SOLE SALES AGENT

111 Broadway, New York 6, N. Y.
104 So. Michigan Ave., Chicago 3, Ill.
350 Townsend St., San Francisco 7, Cal.
2472 Enterprise St., Los Angeles 21, Cal.

MILLIONS LEARN ABOUT BUTYL...



MANUFACTURERS AND MARKETERS have known for several years that Butyl is superior to natural rubber for inner tubes. BUT NOW for the first time, starting with full-page color ads in January 5th issue of LIFE, January 17th SATURDAY EVENING POST, and February 7th in COLLIER'S . . . the motoring public will be told about Butyl!

Fact-packed, strong-selling national Butyl advertising in 1948 will increase consumer demand for more of *your brand* of tubes... *if you identify them as genuine Butyls!*

The public will learn that Butyl tubes:

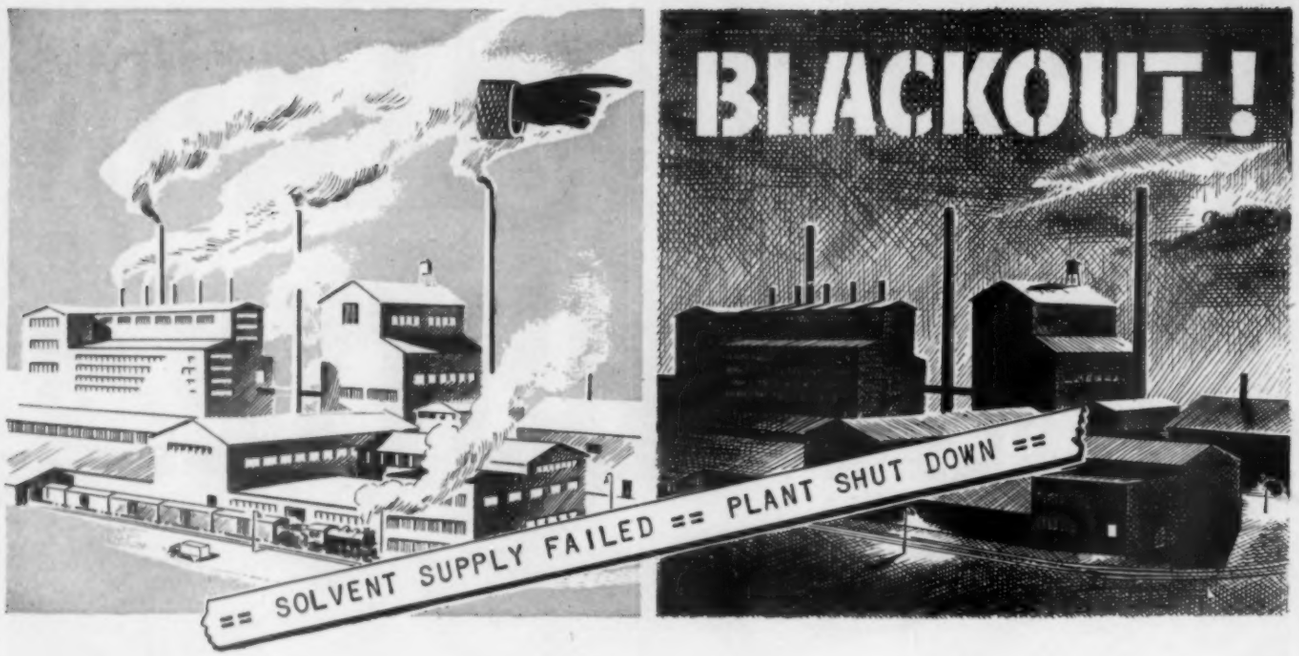
- **Hold air ten times better than rubber.**
- **Provide greater safety against blowouts.**
- **Give greater riding comfort.**
- **Save gasoline and tires.**

Watch for the big Butyl ads . . . and be sure to cash in on the FACTS ABOUT BUTYL with your dealers and their customers. For more information about Butyl, and Butyl inner tubes, write

Butyl

TRADEMARK

ENJAY COMPANY, INC.
15 West 51st Street
New York 19, N. Y.



A LESSON ON THE VALUE OF SKELLY'S

Dependability of Supply!

"DOC" MacGEE SAYS: Maybe the possibility of a delivery failure in your solvent supply . . . due to some unforeseen shortage . . . seems remote to you. Perhaps such a solvent shortage has never caused a temporary shutdown in any department of your plant. But the mere fact that the possibility does exist, and that shutdowns of this nature do occur, makes *extra precaution* only sensible. That is why so many solvent users have come to place a high value upon Skellysolve's *dependability of supply*.

Other things are important, too, of course. Purity, uniformity, close boiling ranges, freedom from foreign tastes and odors . . . all these we guard with unceasing vigilance.

Skellysolve's *dependability of supply*, however, is something else. We are proud of our record in supplying various types of special fractions, unfailingly, without regard to weather, season, or rush of previous orders. We have our own facilities for producing, purifying, fractionating, handling, storing, and transporting extra quality naphthas that are unsurpassed in the field. Solvents are our *business*. We have pioneered many of the developments in the field of special naphthas. And we are in the business to stay!

So, if some failure of your solvent supply would be a serious matter in your plant, we suggest that you give Skellysolve a trial. We're sure that, whether you judge your solvent on quality of product, promptness of service, or dependability of supply, you'll be *satisfied* with Skellysolve!

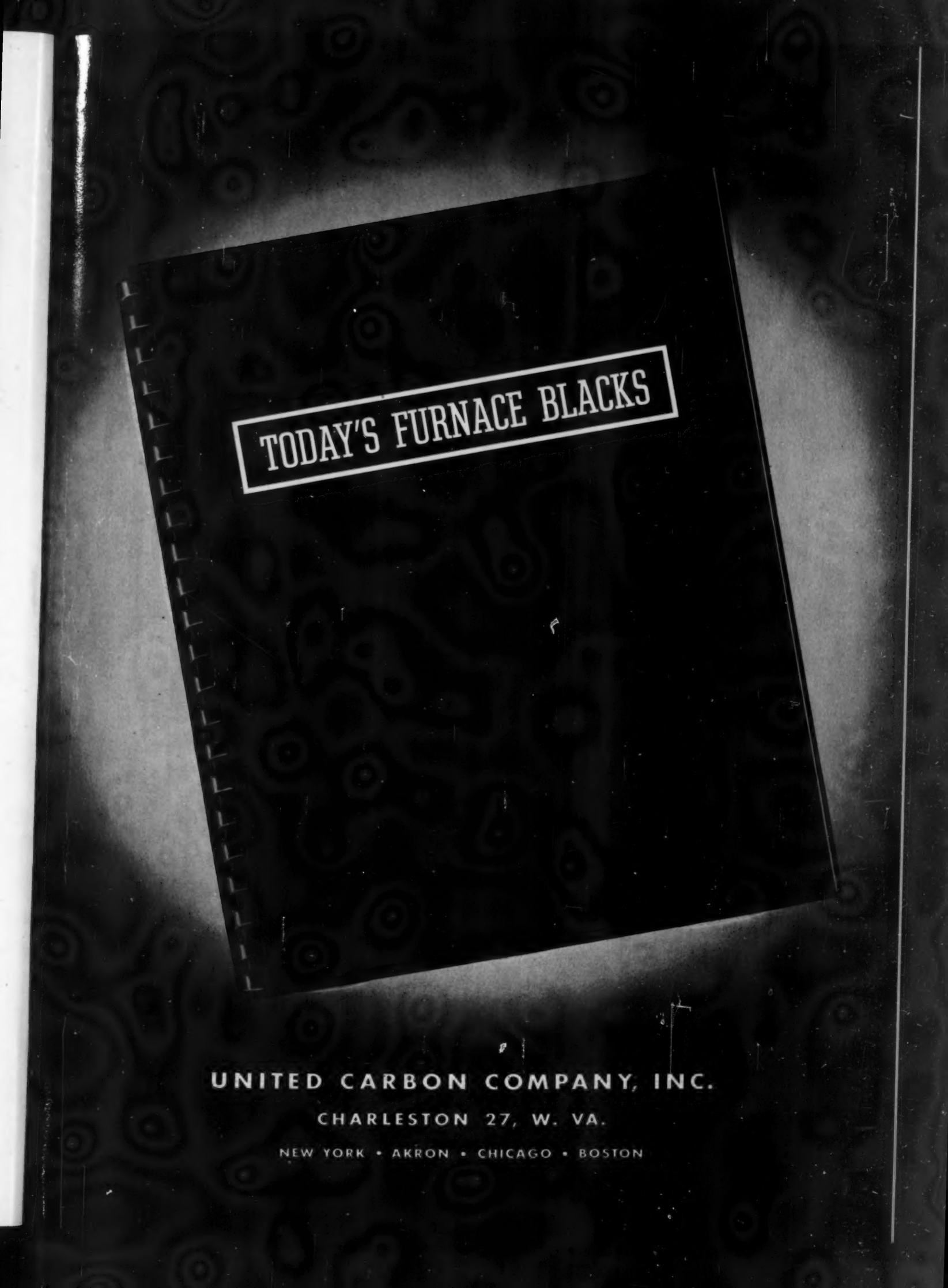
How SKELLYSOLVE Serves the RUBBER INDUSTRY

There are six different types of Skellysolve especially adapted to various uses in this industry, for making rubber cements and for many different rubber fabricating operations. Skellysolve offers many advantages over benzol, rubber solvent gasoline, toluol, carbon tetrachloride, etc. Our Skellysolve Technical Fieldmen have aided many manufacturers in developing formulas for new or improved products, and in "shooting" solvent troubles. Write today for full information.

SKELLY

Skellysolve

SOLVENTS DIVISION, SKELLY OIL COMPANY, KANSAS CITY, MO.



UNITED CARBON COMPANY, INC.

CHARLESTON 27, W. VA.

NEW YORK • AKRON • CHICAGO • BOSTON

More and more CARBON BLACK users are seeking in furnace blacks the means of solving their manufacturing problems and of bettering the performance of the finished products.

For a wealth of fundamental information on all types of furnace blacks and new developments, your attention is directed to our new book

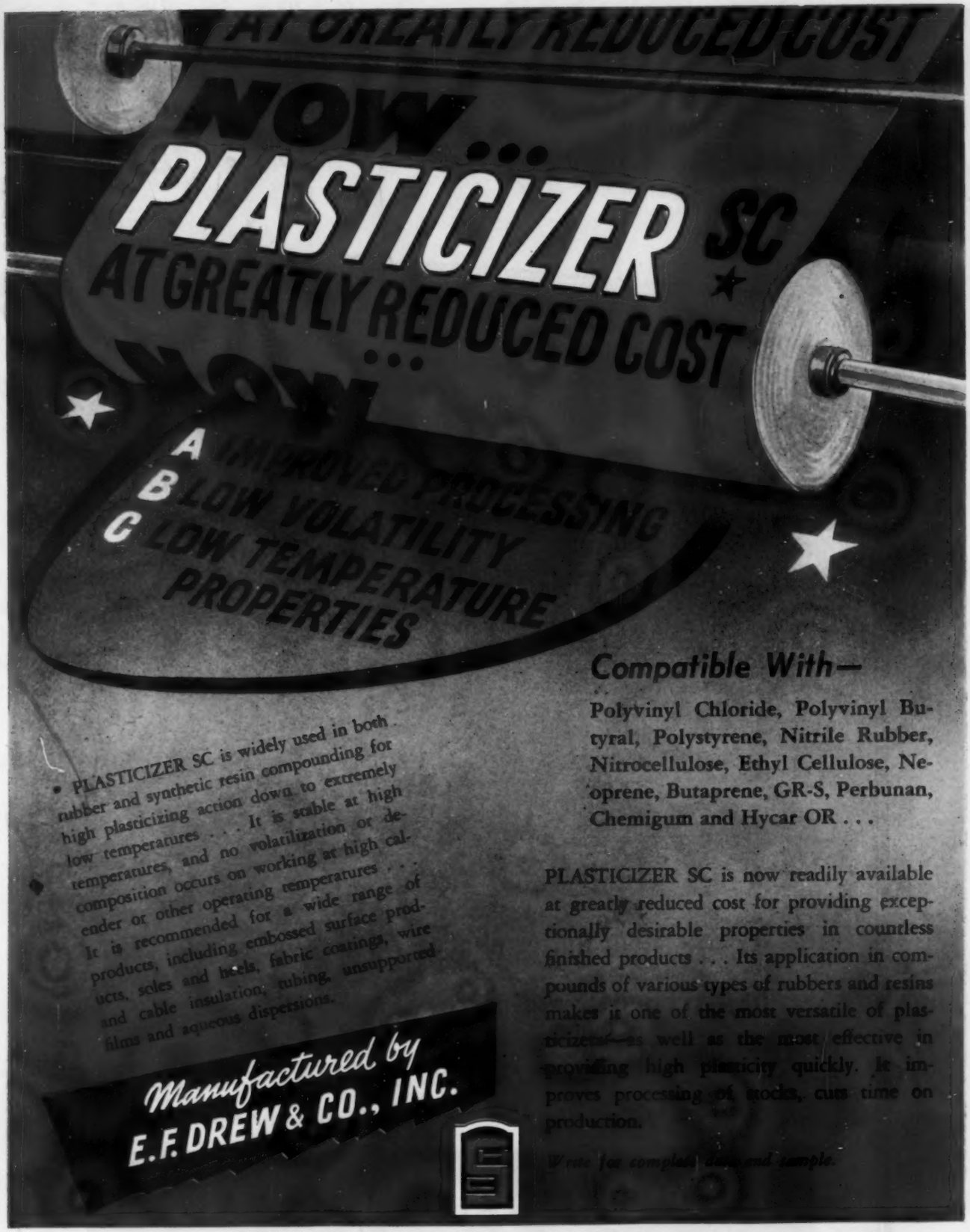
"TODAY'S FURNACE BLACKS"

It should prove exceedingly helpful to you. A copy is yours for the asking. It may be obtained from our sales offices in New York, Akron, Chicago and Boston, or from our Research Division in Charleston, West Virginia.

RESEARCH DIVISION

UNITED CARBON COMPANY, INC.

Charleston 27, West Virginia


AT GREATLY REDUCED COST
NOW...
PLASTICIZER SC
AT GREATLY REDUCED COST
NOW...
A IMPROVED PROCESSING
B LOW VOLATILITY
C LOW TEMPERATURE PROPERTIES
• PLASTICIZER SC is widely used in both rubber and synthetic resin compounding for high plasticizing action down to extremely low temperatures . . . It is stable at high temperatures, and no volatilization or decomposition occurs on working at high calender or other operating temperatures . . . It is recommended for a wide range of products, including embossed surface products, soles and heels, fabric coatings, wire and cable insulation, tubing, unsupported films and aqueous dispersions.
Manufactured by
E.F. DREW & CO., INC.
Compatible With—
Polyvinyl Chloride, Polyvinyl Butyral, Polystyrene, Nitrile Rubber, Nitrocellulose, Ethyl Cellulose, Neoprene, Butaprene, GR-S, Perbunan, Chemigum and Hycar OR . . .
PLASTICIZER SC is now readily available at greatly reduced cost for providing exceptionally desirable properties in countless finished products . . . Its application in compounds of various types of rubbers and resins makes it one of the most versatile of plasticizers—as well as the most effective in providing high plasticity quickly. It improves processing of stocks, cuts time on production.
Write for complete data and sample.
HARWICK STANDARD CHEMICAL CO.
AKRON 8, OHIO
Branches: Boston . . . Trenton . . . Chicago . . . Los Angeles

Thiokol* PR-1

AN IMPROVED OIL, SOLVENT & GREASE RESISTING RUBBER

Characteristics

1 - Good dimensional stability in both aromatic and non-aromatic fuel.

2 - Low swell in solvents.

3 - Low temperature resistance without the aid of extractable plasticizers.

4 - Resistant to cold flow.

5 - Excellent aging characteristics.

6 - Excellent molding properties.

Now Available in Quantity

Samples and technical literature will be sent upon request.

THIOKOL CORPORATION

TRENTON 7, N. J.

** Thiokol Corporation Trademark Reg. U. S. Pat. Off.*

These New Production Facilities *Assure* Even Finer TIRE MOLDS

ACCURACY, precision, and finish are characteristic of tire molds made by BRIDGWATER. The ability to follow every minute design detail, the accurate template fit to all characters and ribs in the design, the sharp corners, and highly polished surfaces mean tire molds unsurpassed anywhere in the world.

To keep abreast of the growing demand for BRIDGWATER molds, our new plant—The Athens Machine Division — was built exclusively for tire mold manufacture—the first of its kind, we believe, in the history of tire making.

The new Athens Machine Division, plus enlarged facilities at our Akron plant, is assurance of fast production, at the lowest possible cost.

THE BRIDGWATER MACHINE COMPANY

Akron, Ohio

FOR BETTER MOLDS FOR BETTER TIRES *SPECIFY* BRIDGWATER

RECIPE

(Test No. 8348 from the Barrett Rubber Research Laboratory)

GR-S : NATURAL RUBBER BLEND

With a Shore A Hardness of 75 for Black Molded and Extruded Goods

This recipe employs GR-S and natural rubber in a 50:50 blend. The compound has excellent processibility, and the vulcanizates have good physical properties. It can be readily extruded or molded, and yields quality products at a low cost.

GR-S: NATURAL RUBBER BLEND BLACK MOLDED AND EXTRUDED COMPOUND

Test No. 8348

RECIPE	WEIGHT BASIS
GR-S Standard	50.00
Smoked Sheets	50.00
CUMAR* Resin, RH grade	15.00
Furnace Black (HMF)	25.00
Clay (Hard)	50.00
Calcium Carbonate (Precipitated)	75.00
Stearic Acid	2.00
"Sunproof"	2.00
Zinc Oxide	5.00
"Aminox"	0.25
Sulfur	3.50
Benzothiazyl Disulfide	1.20
Diorthotolylguanidine	0.30
TOTAL	**279.25**
Mooney Viscosity (Large Rotor) 4 minutes at 212° F	35
Specific Gravity	1.46
Rubber Hydrocarbon, % by wt.	35.8
Rubber Hydrocarbon, % by vol.	56.8

Scorch Test Data: Mooney Viscometer (Small Rotor) at 250° F

Minutes	Viscosity
1	19
5	18
10	17
15	17
20	19

Cure at 316° F (70 lb.)—10 minutes

Tension and Hardness Data:	Unaged	Aged 7 Days at 70° C	Aged 24 hrs. at 100° C
Stress—psi. 300%	1150	1550	—
Tensile—psi.	1800	1800	1400
Elongation—%	430	360	280
Hardness—Shore A	74	80	79
Tear Resistance (Angle) (Pounds Per 1.0 Inch Thickness)	120	100	85
† Crack-Growth Resistance (DeMattia) (Kilocycles Per 0.5 Inch Crack-Growth)	16.3	12.0	4.7
† Compression Set—% (40% Constant Deflection)	34.9	—	—
† Resilience (Yerzley Oscillograph)—%	70.0	66.6	66.3
† Impact Resilience (Goodyear-Healey Resiliometer)—% (15° Angle at Room Temperature)	53.9	55.9	55.4

† Specimens cured 15 minutes at 316° F (70 lb.)

Barrett*

THE BARRETT DIVISION
ALLIED CHEMICAL & DYE CORPORATION
40 Rector Street, New York 6, N. Y.
In Canada: The Barrett Company, Ltd.,
5551 St. Hubert St., Montreal, P. Q.
*Reg. U. S. Pat. Off.

Fluffy as Goose Feathers

Slippery as an eel

AERO-BRAND Quality STEARATES

AERO* BRAND STEARATES are light, fluffy, pure . . . to make some products as *slippery* as possible with minimum lubricant . . . to impart *smoothness* to others . . . to *reduce friction* in still others.

Uniform quality?

You bet! And for both large and small orders.

For Cyanamid's production, (most modern facilities of their kind, incidentally), is rigidly controlled every step of the way—from the acid . . . to final quality stearate.

We're ready to be your *dependable* source of supply. Just be sure to specify AERO BRAND on your Calcium . . . Zinc . . . Aluminum . . . Magnesium stearate orders.

*Trademark

SALES OFFICES: Boston, Massachusetts; Philadelphia, Pennsylvania; Pittsburgh, Pennsylvania; Baltimore, Maryland; Charlotte, North Carolina; Cleveland, Ohio; Cincinnati, Ohio; Chicago, Illinois; Detroit, Michigan; Kalamazoo, Michigan; St. Louis, Missouri; Los Angeles, California; San Francisco, California; Seattle, Washington.

American
Cyanamid Company

Industrial Chemicals Division

30 ROCKEFELLER PLAZA, NEW YORK 20, N. Y.

BOSTIK Customized Adhesives have been Completely Successful in Solving Our Tough Bonding Problems

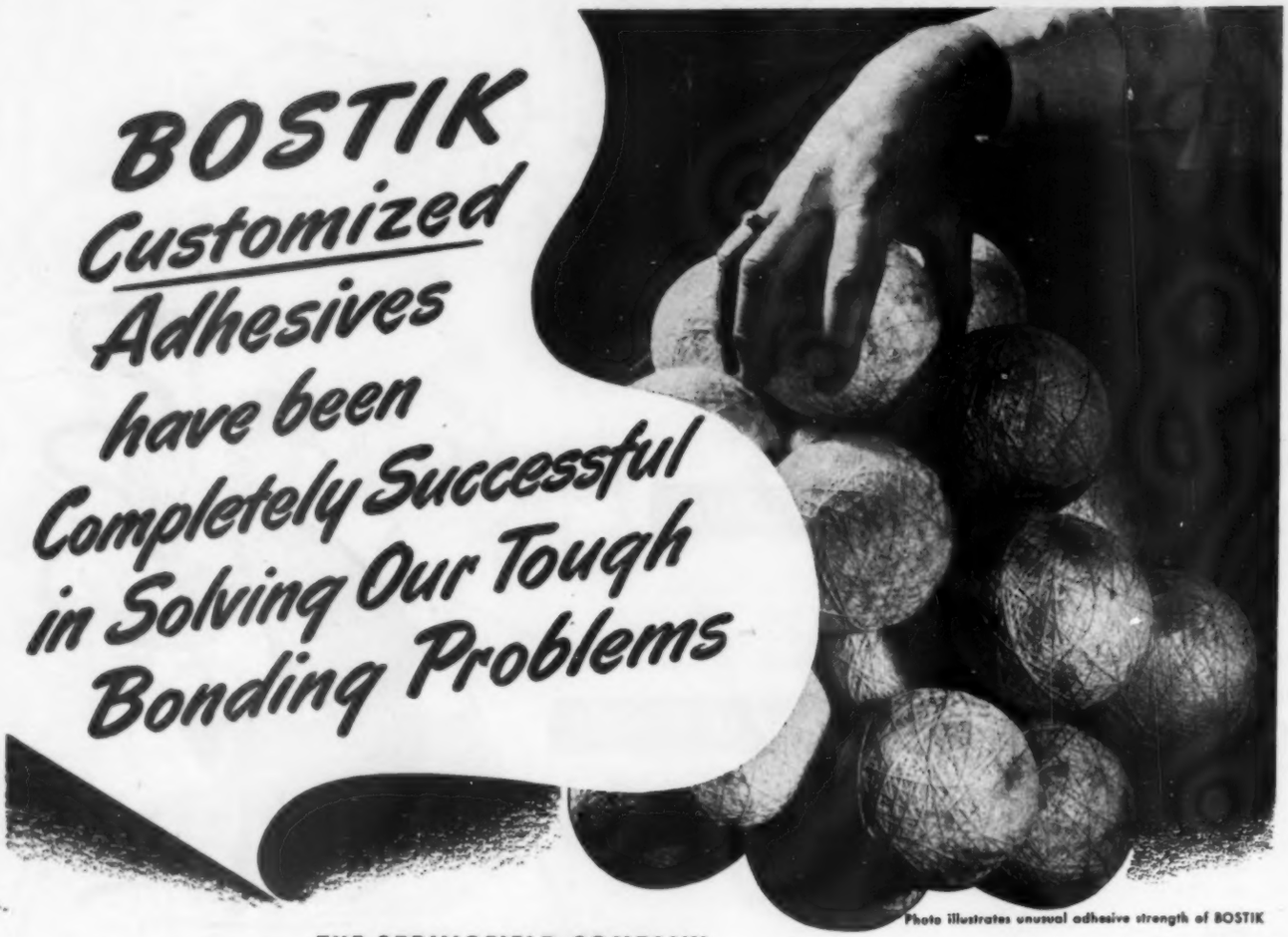


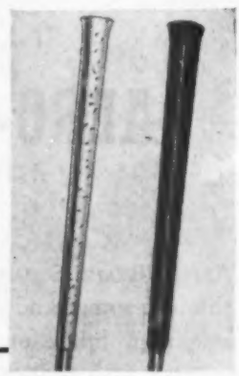
Photo illustrates unusual adhesive strength of BOSTIK

THE SPRINGFIELD COMPANY

The Springfield Company, Springfield, Mass., manufacturer of quality athletic equipment, had two special adhesive problems:

1. An adhesive which would securely bond together the layers of the final winding of fine gauge cotton used in all top grade softballs and baseballs. *This same adhesive must also bond the outside leather cover to the ball's center.*

2. An adhesive which would firmly bond the cork-and-rubber composite grip foundation to steel golf club shafts. *This same adhesive must also bond the outer leather grip to the cork-and-rubber foundation.*



Says Mr. Roger Heroux, Purchasing Agent:

"In solving both of these very tough bonding problems, BOSTIK *Customized* Adhesives have been completely successful. They give a sure, lasting tack. As a matter of fact, BOSTIK tackiness is so permanent that we never have to use activating agents when completing work on jobs which have been given their BOSTIK coatings *as much as six months previously.* In considering that professional athletes give our products the toughest possible usage, it is obvious that the adhesives which go into our products have to be especially good. BOSTIK certainly is superior!"

There's a BOSTIK *Customized* Adhesive to bond any material to any material in any combination. Write for details today — ask for your copy of "Adhesive Facts."

B B CHEMICAL COMPANY, CAMBRIDGE, MASS.

"Whatever It Is BOND IT WITH BOSTIK"

Customized Adhesives

4 BAKER CHEMICALS
of interest to
The Rubber Industry

MAGNESIUM OXIDE
(Neoprene Grade)

A very light, finely-divided powder completely uniform in bulk density, particle size, and chemical activity. Calcined in electric furnaces to insure dependable performance when it is compounded with neoprene and other synthetic rubbers.

MAGNESIUM CARBONATE
(Technical Light Powder)

Particular emphasis is placed on uniformity of physical specifications, which reflect in trouble-free compounding of rubber products. Impurities such as iron and calcium are extremely low due to exacting chemical control.

CALCIUM NITRATE
(Technical Crystal)

A high purity chemical especially manufactured to meet the requirements of compounders of latex products. It is produced as creamy-white crystals 1½" and smaller in diameter, containing 3 molecules of water of crystallization.

CARBON DISULFIDE
(Carbon Bisulfide)

Freedom from other sulfides (Assay of 99.99%) makes Baker's carbon Disulfide a preferred solvent in the rubber industry. Manufacture by a unique electro-thermic method, with continuous rather than batch distillations, insures uniformity.

J. T. BAKER CHEMICAL CO.
Executive Offices: Phillipsburg, N. J.

Baker's Chemicals

C. P. ANALYZED · FINE · INDUSTRIAL

• PELLETEX • GASTEX • PELLETEX • GASTEX • PELLETEX • GASTEX • PELLETEX • GASTEX • PELLETEX • GASTEX • PELLETEX •

PELLETEX • GASTEX • PELLETEX • GASTEX • PELLETEX • GASTEX • PELLETEX • GASTEX • PELLETEX • GASTEX •

R. D. WOOD 3400-TON TWO-OPENING PLATEN PRESS

For

VULCANIZING and CURING
RUBBER COMPOSITION SHEET PACKING,
FLOOR TILE, and RUBBER BELTING

Newest member of the R. D. Wood "Press Family" is this Two-Opening Multiple Cylinder Type Hydraulic Steam Platen Press. Designed for vulcanizing and curing rubber composition sheet packing, or floor tile; also, with the addition of stretching and clamping units, adaptable for vulcanizing rubber belting.

Top and bottom platen members are of sectional construction. The one-piece moving platen is made from open hearth steel casting, with movement guided to assure the proper adjustment to compensate for expansion and contraction under changing temperatures. Intermediate steam platen is column guided, suspended by means of steel hanger rods, and accurately spaced with press in open position. Various press sizes and capacities can be furnished to meet product requirements. If you want more details, or engineering advice, ask R. D. WOOD COMPANY, Independence Square, Philadelphia 5, Pa.

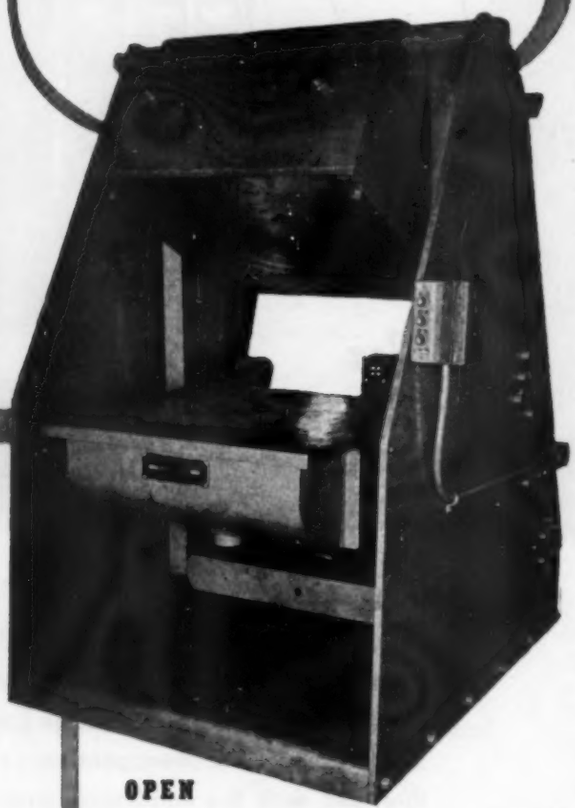
HYDRAULIC PRESSES AND VALVES FOR EVERY PURPOSE • ACCUMU[illegible] • INTENSIFIERS

R. D. Wood Company

STANMOCO
hydraulic toggle presses

EQUIPPED WITH KNOCKOUTS OFFER BIG LABOR SAVINGS

CLOSED



OPEN

Specifications

Platens	34"x 34"
Maximum Opening	14½"
Pressure	200 Tons

Operation: Manual or automatic through use of cycle timers.

Press designed for use with 750 pounds hydraulic oil pressure.

Press can be furnished with or without hydraulic pumping unit.

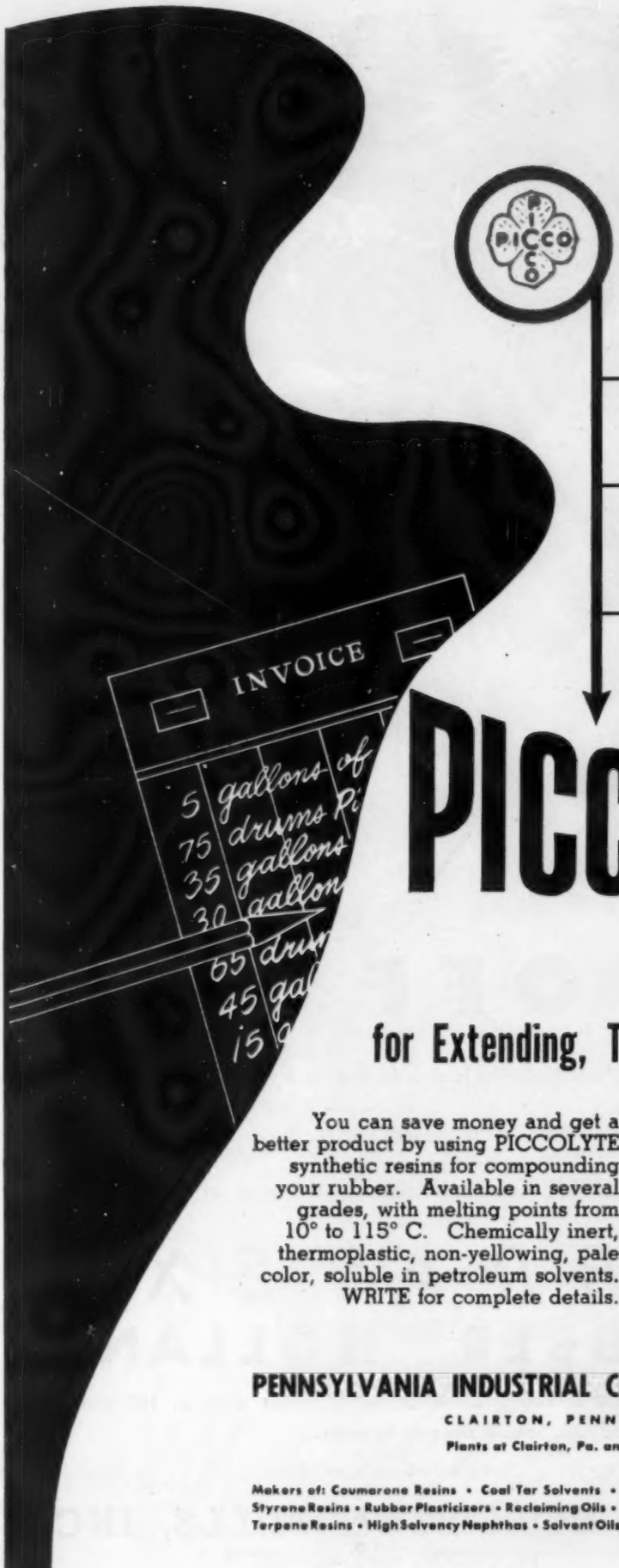
Special knockouts can be furnished to meet individual requirements.

Presses can be furnished complete with molds and knockouts for any special molding job.

Write for complete details

The Akron Standard Mold Co.

Akron — "The Established Measure of Value" — Ohio



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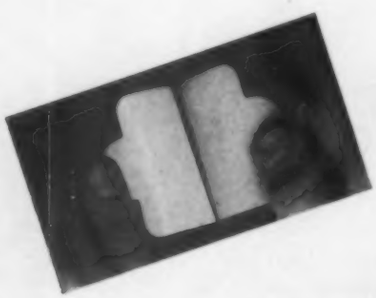

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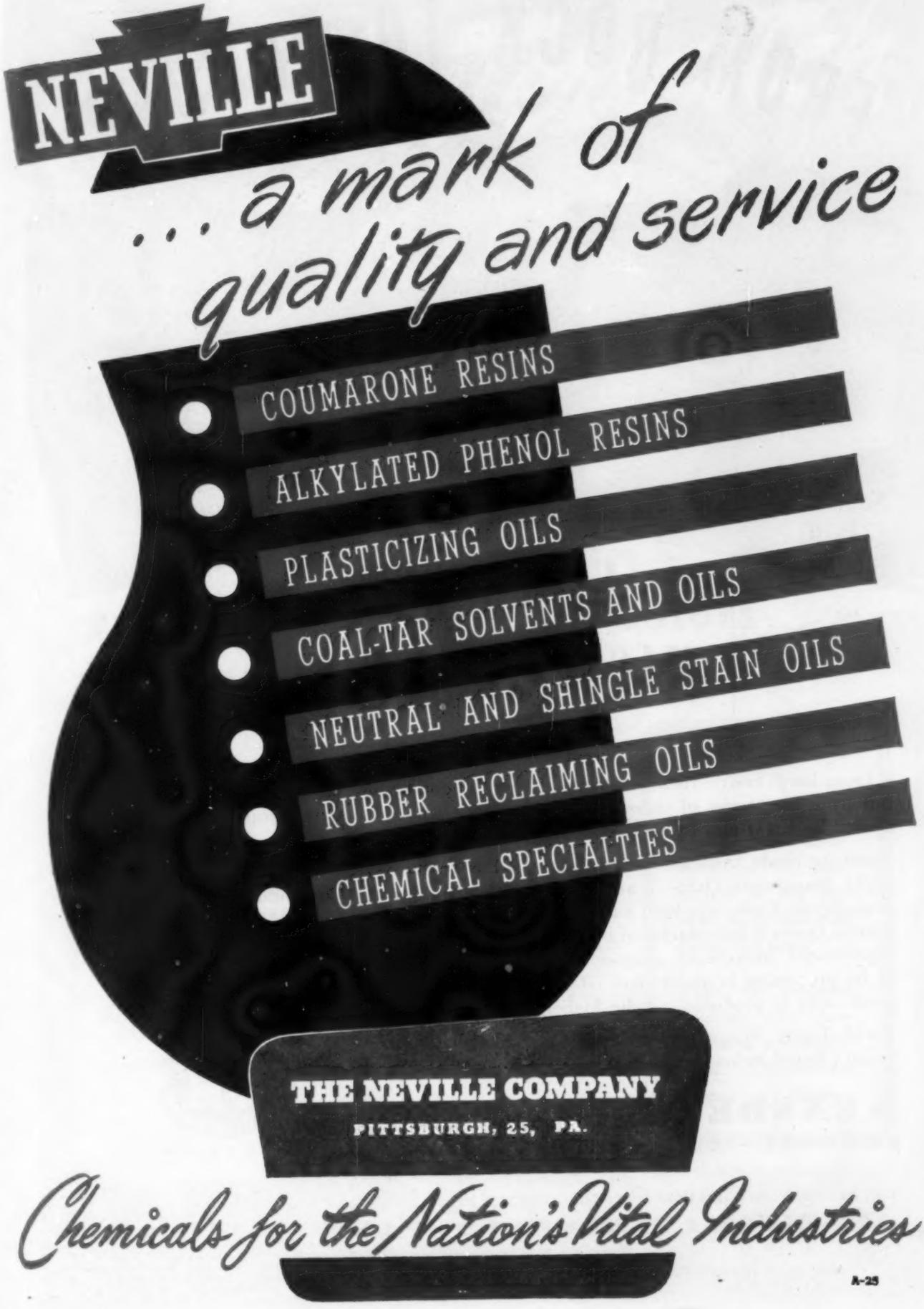
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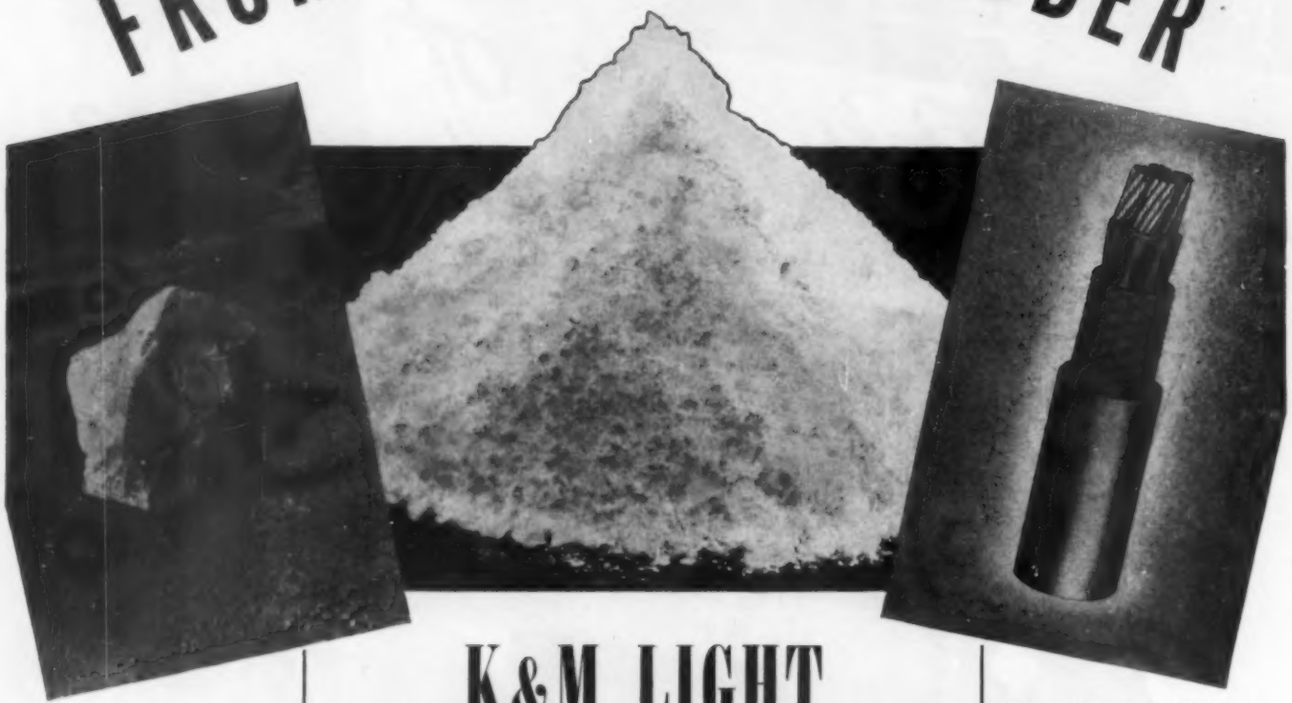

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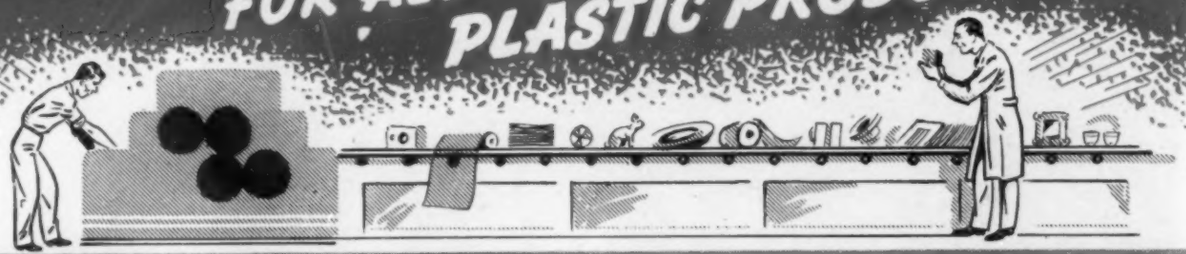

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This new type constant tension continuous takeup with integral capstan and drive was developed as the result of many years of experience by IOI engineers in the design of winding equipment.

The machine features an adjustable constant tension reel drive and an ingenious and efficient system of loading and unloading reels without interrupting the winding process. A cantilevered demountable alloy shaft assembly makes reel loading and unloading a simple and easy operation that eliminates the possibility of damaging the reel flanges.

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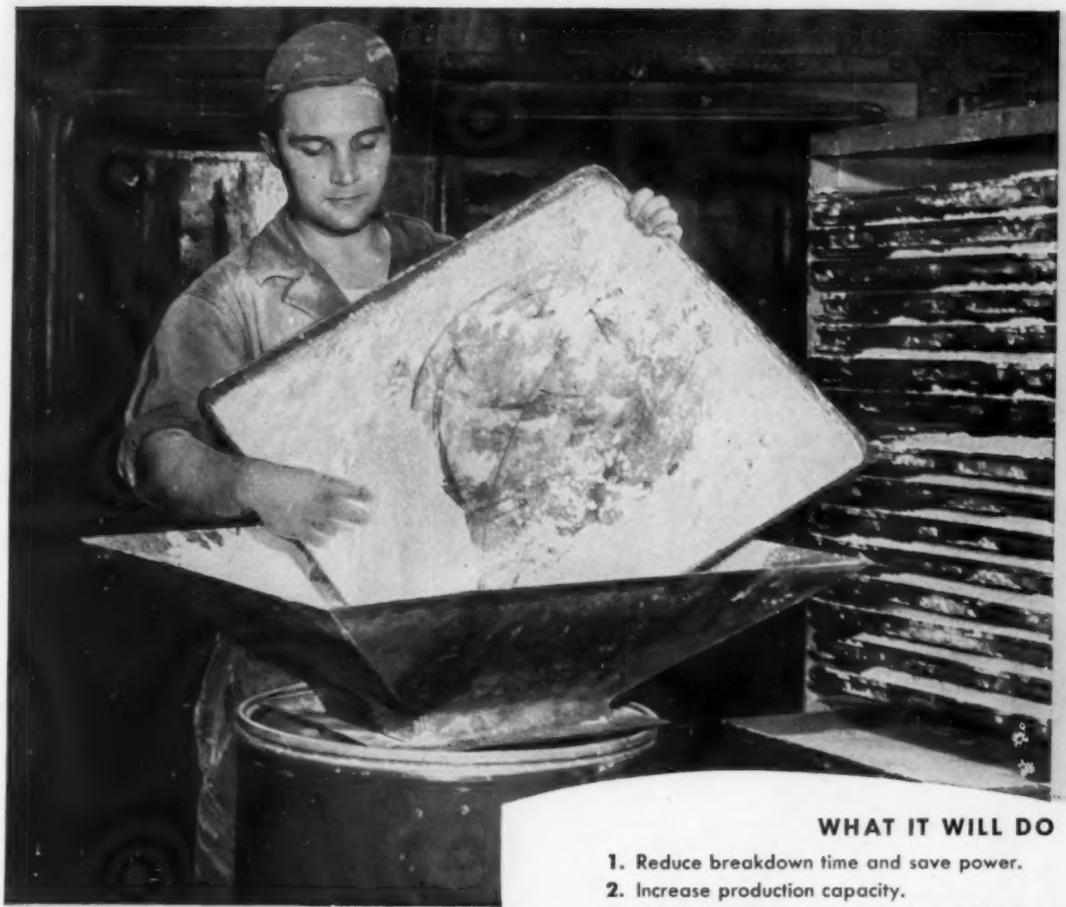

Transferring PEPTON 22 Plasticizer from trays in drying oven to drum at Calco plant.

PEPTON*22 PLASTICIZER

WHAT IT WILL DO

1. Reduce breakdown time and save power.
2. Increase production capacity.
3. Produce softer Natural rubber or GR-S in a given milling time.
4. Produce soft GR-S with plasticities which show no appreciable change on standing.
5. Control GR-S gel build-up in hot processing.
6. Plasticize reclaimed rubber, mixtures of reclaimed rubber and Natural rubber or GR-S, and also mixtures of Natural rubber and GR-S.
7. Produce softer or more plastic Natural rubber or GR-S mixed stocks in direct mixing.
8. Reduce heat developed in processing and thereby lower the processing temperatures.
9. Improve processing qualities and reduce rejects.
10. Give good physical properties.

Excellent for Sponge Rubber

WHAT IT WILL NOT DO

1. It will *not* produce dermatitis or toxic effects.
2. It will *not* discolor white or light-colored stocks.
3. It will *not* bloom.
4. It will *not* affect aging adversely.

PEPTON 22 Plasticizer, now available in pilot plant quantities, can be supplied in unlimited quantities effective January 1, 1948.

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Technical Bulletin No. 41 — on the Compounding of GR-S with Substantial Loadings of ZINC OXIDE

Butadiene—Dichlorostyrene Polymers with 100 Parts of Zinc Oxide

Results with the chlorostyrene polymers have been reported in Technical Bulletins 32 and 35. Interest still continues in these experimental modifications of GR-S on account of improved properties with mineral pigments. The office of Rubber Reserve has recently had prepared at the Government Laboratories at Akron, Ohio two modifications of the dichlorostyrene type which are defined as follows: *"XP-40A is a 70/30 butadiene-dichlorostyrene copolymer having a 57 Mooney, prepared by using the XP-8 recipe (activated and low temperature polymerization)." "XP-42 is a 71/29 butadiene-dichlorostyrene copolymer having a 56 Moonoy and prepared according to the standard GR-S formula."*

NOTE: These polymers will not be in regular production in the near future, although limited samples could be made available for evaluation upon request to the Research and Development Division, Office of Rubber Reserve, Reconstruction Finance Corporation, Washington 25, D.C.

COMPOUND NO. 41	
Polymer	100.0
Sulfur	3.0
MBT	2.0
D.P.G.	0.1
Coumarone-indene Resin	7.5
E.L.C. Magnesia	5.0
ZINC OXIDE	100.0

ORIGINAL RESULTS

Time of Cure Min. at 45 Lb.	Tensile Strength (psi)	Per Cent Elongation	Modulus Load (psi) for Elongation of: 200%	300%	400%	500%	Permanent Set	Shore Hardness	Tear Resistance Tested at: Room Temp.	100°C.
XP-40A										
2	2520	870	125	170	250	380	.32	46	—	—
4	2650	770	200	275	395	635	.37	49	80	40
7.5	2940	730	240	320	485	810	.42	50	79	40
15	2960	670	280	400	600	1040	.43	51	77	40
30	2700	620	285	450	690	1310	.40	53	77	39
45	2780	615	285	445	685	1290	.37	54	80	40
60	2620	600	285	445	810	1330	.35	54	86	41
90	2620	595	315	475	790	1350	.32	54	82	45
XP-42										
2	2060	830	130	215	300	470	.34	45	—	—
4	1940	695	235	350	505	775	.34	48	78	41
7.5	2180	680	240	315	515	870	.42	50	76	42
15	2140	620	285	360	645	1090	.43	52	74	40
30	2040	575	280	440	680	1280	.40	53	77	36
45	2060	570	240	445	725	1330	.40	53	77	36
60	1940	560	285	485	765	1370	.36	53	74	37
90	1530	525	285	445	725	1290	.29	53	76	35

Time of Cure Min. at 45 Lb.	Goodyear-Healey Pendulum: Indention in mm.	Per Cent Rebound	Hardness: Shore	Rex	Compression Fatigue (Goodrich Flexometer)*: Per Cent Initial Comp.	Running Time and Per Cent Permanent Set	Max. Temp. Rise °C	Dynamic Compression: Initial	Final	Cut-Growth Resistance Tested at 70°C. Inches Failure: 400 Cyc.	1500 Cyc.
XP-40A											
60	7.51	60.9	52	55	24.3	15′ —5.3	22.1	13.6	16.0	.15	.36
XP-42											
60	7.49	60.2	52	55	25.4	55′ —27.3	61.0 (At 15′ 37.0)	16.1	37.2	.16	.30

*Test Conditions: 143 Lb. Load. 0.175" Stroke. 100°C. Oven Temp.

THE RESULTS with XP-40A are generally outstanding with respect to stress-strain (approaching closely the results with a similar loading in natural rubber), tear resistance, pendulum rebound and heat generation. Both polymers exhibited good milling properties and had a rating of 2 according to the duPont scale for millability, originally developed for Neoprene. XP-40A was emulsified with low soap resulting in low acid in the finished polymer. This appears to be essential in order to obtain the best results with Zinc Oxide.

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De-vulcanizers

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Check This List of Columbia Pigments Data Sheets . . . Write For Those You Need

No. 47-1—General Compounding Data of Silene EF and GR-S Formulations

No. 47-2—Effect of Ethylene Glycol on Silene EF and Natural Rubber Compositions

No. 47-3—Data on Silene EF in Natural Rubber

No. 47-4—Comparison of Mixtures of Calcene T and Silene EF With Other Fine Calcium Carbonates in GR-S at Medium and High Loadings

No. 47-5—Highly Loaded Silene EF Stocks

No. 47-6—Comparison of Calcene T With Various Calcium Carbonate Pigments in Natural Rubber

No. 47-7—Data on Silene EF and Calcene T in GR-S-10, GR-S-X-141 and GR-S-X-245

Continual research on these Columbia pigments has produced interesting, valuable data on their use in compounding both natural and synthetic rubbers for a wide range of applications.

Data recently published is listed at the left. You are invited to write for any of these Columbia Pigments Data Sheets you want—please specify by number. Address Pittsburgh Plate Glass Company, Columbia Chemical Division, Fifth Avenue at Bellefield, Pittsburgh 13, Pa.

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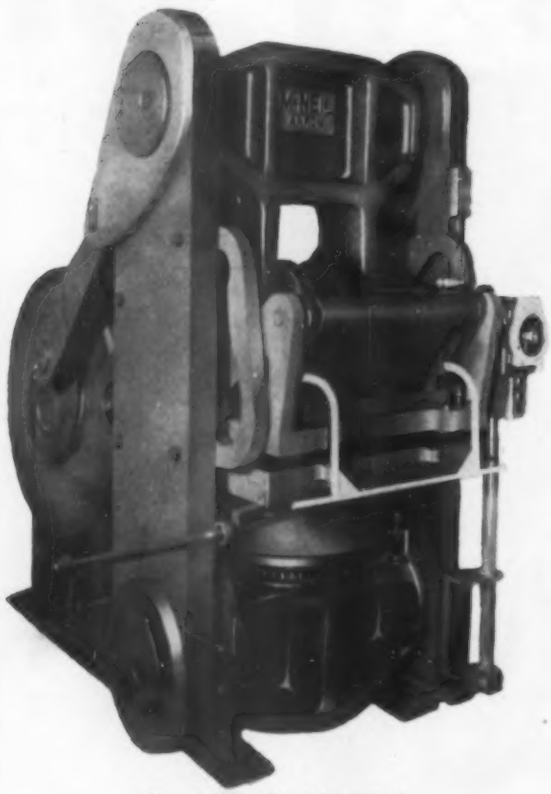

Closed View, Model 800-32-5

Open View — Model 800-32-5

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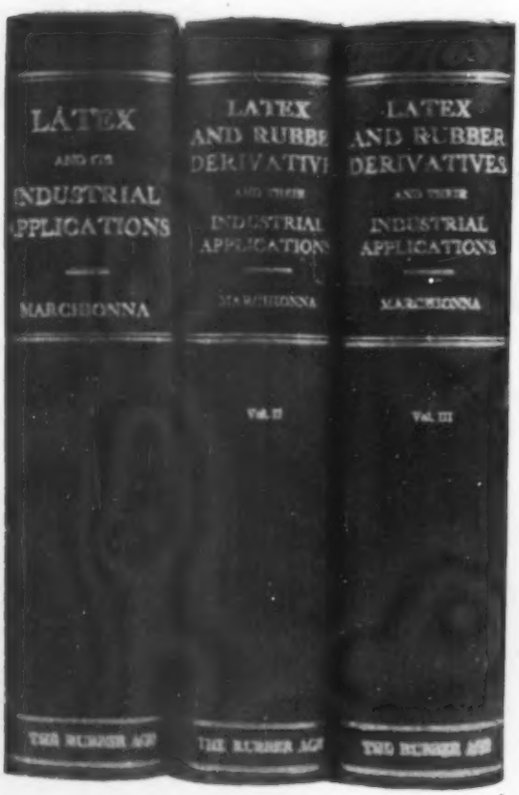

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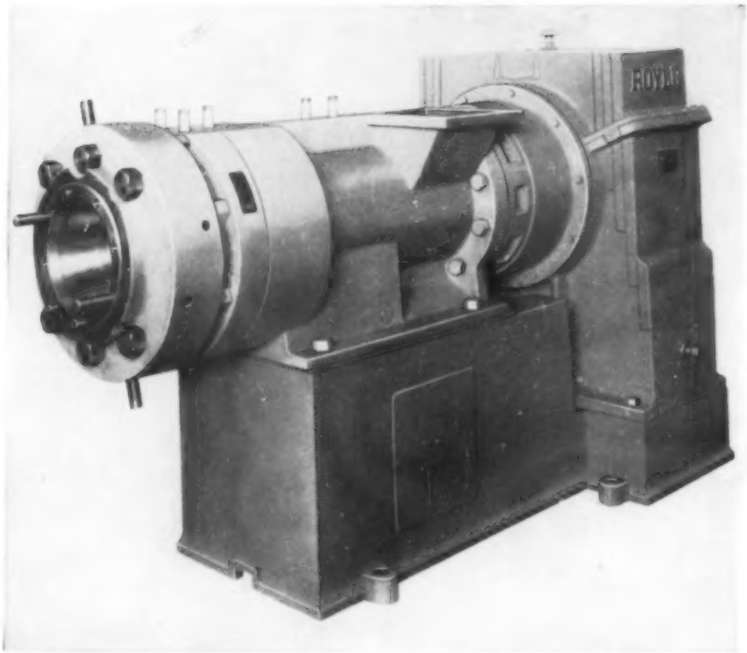

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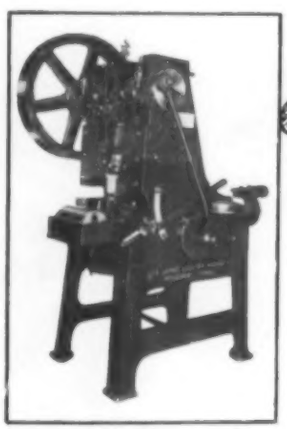
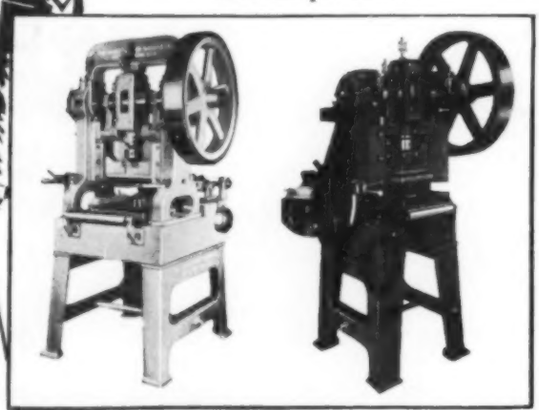


MODEL A-1



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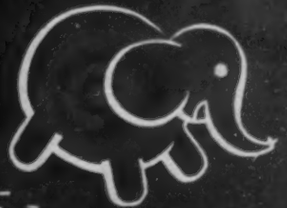

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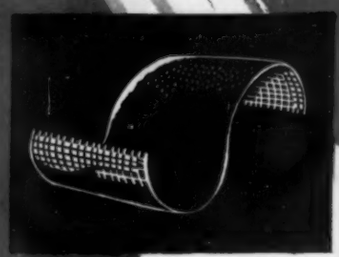

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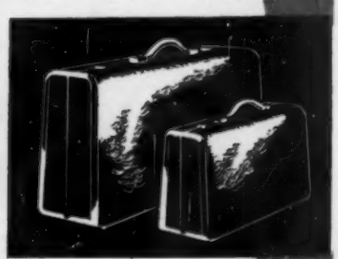

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RUBBER AGE

VOL. 62, No. 5 FEBRUARY, 1948

Synthetic Elastomers as Plasticizers for Condensation Polymers

I—Thermosetting Perbunan-Phenolic Compounds

By R. G. NEWBERG[1], D. W. YOUNG[2], and W. A. FAIRCLOUGH[3]

IN THE PAST a number of workers such as Allison *(2)*, Van Der Meer *(9)*, Alfrey and co-workers *(1)*, Billings and Harford *(3)*, Kenney *(4)*, Rose *(5)*, Shepard and Boiney *(6)*, and Winkelmann *(10)* have reported studies on rubber-phenolic blends. Van Der Meer *(9)* has presented a theoretical discussion of the chemical reactions that take place when natural rubber cures with phenolics. Some of the other investigators have given a limited amount of information about the properties of oil resistant (Buna N) polymer-phenolic blends.

The primary objective of this study is to present experimental data on combinations of Perbunan NS polymers with a number of modified phenolic resins. It is hoped that from these data many valuable practical applications of such blends may be evolved. The Perbunan NS polymers are a commercial class of butadiene-acrylonitrile rubbers stabilized with an improved non-staining and non-toxic antioxidant (Deenax*). The number following Perbunan (as Perbunan 26) indicates the per cent acrylonitrile in the polymer. The types of phenolics included in this work were Cardolite 904, Durez 12687, Monsanto 378, Wilcorite R-10H, and the like. Efforts were made to include not only highly reactive types such as Monsanto 378 but also those less reactive such as Cardolite 899 and Cardolite 848.

[1, 2] Standard Oil Development Co., Elizabeth, N. J.
[3] Enjay Co., Inc., 15 West 51st St., New York 19, N. Y.
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A coordinate phase of the work included the use of high molecular weight hydrocarbon polymers (saturated and unsaturated) as modifying agents for phenolics and phenolic-Perbunan blends. These hydrocarbon polymers evaluated in the phenolics were polybutadiene, poly-2-methylpentadiene and S-polymers *(7, 8)*. The polybutadiene was made by the emulsion polymerization method and the poly-2-methylpentadiene was made by the low temperature polymerization method *(11)*.

Experimental

Initial investigations of the phenolic-rubber polymer systems indicated incompatibility of rubber-like hydrocarbon polymers in phenolics (Durez 12687). The data are presented in Table I. Those blends containing the higher styrene content polymer (S-60) showed good physical properties. This is indicated by the fact that S-60 is more soluble in methyl ethyl ketone (a solvent for Durez 12687) than are the other hydrocarbon polymers evaluated. To some extent the higher tensile strength evidenced in the S-60-Durez 12687 blend can be attributed to the inherently higher strength of S-60. Subsequent data involving product compounding also demonstrated the value of the saturated S-polymers as modifiers in the Perbunan-phenolic system for improved processing, increased tear resistance, and better aging properties.

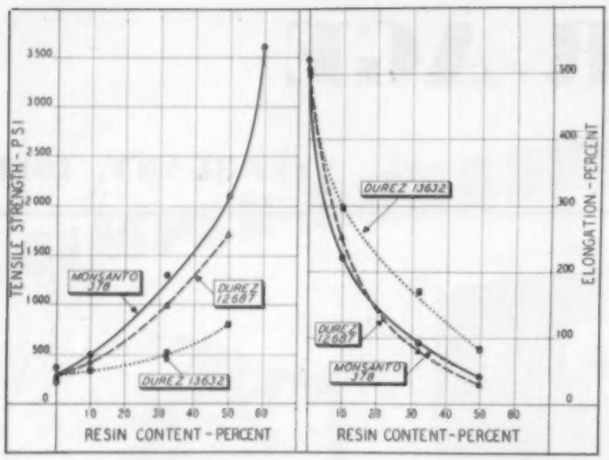

FIG. 1—Phenol Resin-Perbunan 26 NS Blends. No sulfur or accelerator. (Cure: 15' @ 325°F.).

The building blocks for this study were the various Perbunan types and a number of commercial thermosetting resins. They were tested in a range of concentrations (100% rubber to 30% rubber) both with and without rubber vulcanizing agents and compounding ingredients. Studies exemplified by Figures 1, 2, 4 and 5 served as a yardstick for determining the more promising resins for subsequent investigations.

Sample Preparation

Milling Procedure: Most of the resins will cure or thermoset at temperatures slightly above their melting points. Therefore, because of the relatively long mixing cycles required for rubber-like polymers the compounding temperatures were held to a minimum (130° F.) in order to eliminate scorching. Coupled with this it seemed conceivable that mixing time might affect the ultimate physical properties through degree of dispersion or mechanical mastication of the polymer. In an effort to ascertain maximum physical properties a study was made of mill mixing time at constant temperature as shown in Table II. It was evident that short mixing times were feasible and were reflected in good physical properties. Also, extended periods of mixing did not contribute in any way to product quality. For simplification all subsequent mixing was therefore standardized at 15 minutes at 130° F. mill roll temperature.

Molding Method: For those compounds which exhibited rubber-like properties this operation was carried out in a standard A.S.T.M. four-cavity mold (D-15-41) yielding slabs 6" x 6" x 0.075". All stocks were cured between cellophane to eliminate possible adhesion to the molds. Those blends having semi-rigid, rigid or resinous properties were molded in slabs 6" x 6" x ½". Samples for test were subsequently machined from these slabs.

Test Methods

The following tests were conducted on those compounds having rubber-like characteristics:

Tensile Strength, 100 Per Cent Modulus, and Ultimate Elongation: A.S.T.M. D412 - 41 on rubber - like specimens.

Shore Durometer Hardness: Shore "A" durometer (A.S.T.M. D-676-44T).

Brittle Temperature: The instrument used was that described under A.S.T.M. D-746-44T. The specimens were allowed to condition 25 minutes in air to reach equilibrium temperature in the bath prior to testing.

Volume Increase: These values were obtained in standard laboratory fluids at room temperature (77°F.). SR-6 or A.S.T.M. D-471-46T Reference Fuel No. 2 was formulated from 60% diisobutylene, 20% toluene, 15% xylene and 5% benzene. SR-10 or A.S.T.M. Reference Fuel No. 1 was pure diisobutylene. A.S.T.M. Oil No. 3 was mineral oil with an aniline point of 70° C.

Stiffness Test: The stiffness values were obtained by the use of the Tinius - Olsen Tour - Marshal Tester, A.S.T.M. D-747-43T.

Tear Resistance: A.S.T.M. D-624-44.

The following tests were conducted on those materials having resinous or rigid properties:

Compressive Strength: A.S.T.M. D-695-42T. Specimens ½" x 1" x 1" were used.

Tensile Strength: A.S.T.M. test D-638 - 42T was used on rigid specimens.

Heat of Distortion: A.S.T.M. D-648-41T.

Flexural Strength: A.S.T.M. D-650-42T.

Impact Strength: A.S.T.M. D-256-43T.

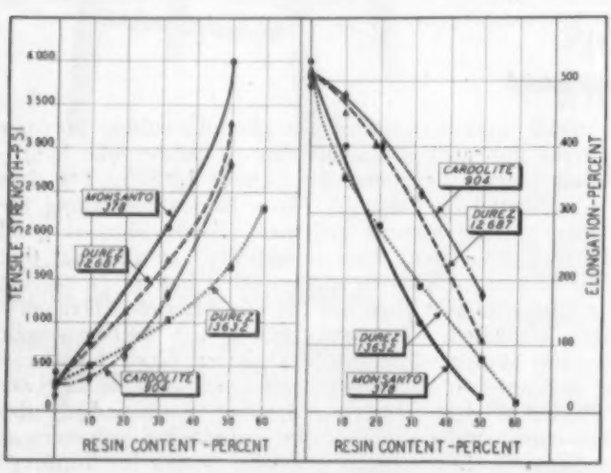

FIG. 2—Phenol Resin-Perbunan 35 NS Blends. No sulfur or accelerator. (Cure: 15' @ 325°F.).

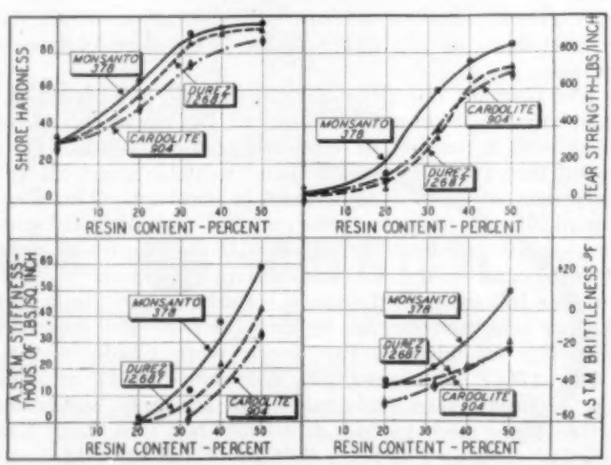

FIG. 3—Phenolic Resin-Perbunan 35 NS 90 Blends. No sulfur or accelerator. (Cure: 30' @ 325°F.).

Table I—Hydrocarbon Polymer-Phenolic Blends

Non-Sulfur Cure

	A				B				C				D			
Durez 12687			50				50				50				50	
S-40 Polymer			100				—				—				—	
S-50 Polymer			—				100				—				—	
S-60 Polymer			—				—				100				—	
S-40-B-3			—				—				—				100	
Hexamethylenetetramine			7.5				7.5				7.5				7.5	
Zinc oxide			5				5				5				5	
Cure at 325° F., minutes	H	T	E	B	H	T	E	B	H	T	E	B	H	T	E	B
30	78	530	180	20	87	970	50	20	84	1360	20	20	81	920	130	20
45	90	810	160	20	95	1600	40	20	93	2390	10	20	91	1190	120	20

Sulfur Cure

	E				F				G				H				I			
Durez 12687			50				50				50				50				50	
S-40 Polymer			100				—				—				—				—	
S-50 Polymer			—				100				—				—				—	
S-60 Polymer			—				—				100				—				—	
2-methylpentadiene polymer			—				—				—				100				—	
Polybutadiene			—				—				—				—				100	
Hexamethylenetetramine			7.5				7.5				7.5				7.5				7.5	
Zinc oxide			5				5				5				5				5	
Stearic acid			0.75				0.75				0.75				0.75				0.75	
Sulfur			0.75				0.75				0.75				0.75				0.75	
Benzothiazyl disulfide			0.75				0.75				0.75				0.75				0.75	
Cure at 325° F., minutes	H	T	E	B	H	T	E	B	H	T	E	B	H	T	E	B	H	T	E	B
30	75	600	160	10	85	910	20	20	93	1600	10	20	51	160	30	40	50	400	30	40
45	77	600	60	20	87	1100	20	20	96	2590	10	20	53	220	30	40	51	410	30	50

Note: The following abbreviations are used in all tables: B, Brittle Temperature, F.; E, Ultimate Elongation, %; H, Durometer Hardness; M1, Modulus at 100% Elongation, psi.; M2, Modulus at 200% Elongation, psi.; T, Tensile Strength, psi.

Table II—Mill Mixing Time versus Physical Properties of Perbunan 35 NS 90-Monsanto 378 Blends

Recipe	
Perbunan 35 NS 90	100
Monsanto 378	50
Zinc oxide	5
Sulfur	2
Stearic acid	1
n-cyclohexyl-2-benzothiazole sulfenamide	1

Specific Gravity: 1.099
Cure: 15 minutes at 325° F.

Mill Mixed at Roll Temperature of 130° F., minutes	10				12				15				30				60			
	H	T	E	M1	H	T	E	M1	H	T	E	M1	H	T	E	M1	H	T	E	M1
Original	92	2370	320	1540	86	1660	180	1390	87	1850	210	1420	85	1820	220	1440	90	1860	190	1650
Oven Aged for 70 hours at 212° F.	93	2940	210	2280	91	2290	140	2160	87	2260	150	1940	90	2090	140	1910	91	2270	110	2230
Crescent Tear Resistance, lb./in.			600				440				430				450				450	
Brittle Temperature, F.			—20				0				—10				0				—10	
Stiffness in Flex at 75° F., psi.			7810				5230				7530				5710				6270	
Immersed at Room Temperature, hr.		24		168		24		168		24		168		24		168		24		168
Volume Increase, %, in																				
A.S.T.M. Reference Fuel No. 1		+0.7		+2.5		+0.4		+1.8		+0.5		+2.5		+0.4		+1.7		+0.3		+2.0
A.S.T.M. Reference Fuel No. 2		+21.0		+37.0		+12.7		+34.5		+11.3		+32.8		+12.8		+35.0		+12.8		+35.0
A.S.T.M. Oil No. 3		—0.5		+1.3		—0.6		+0.6		—0.4		+0.6		—0.3		+0.7		—0.5		+0.6
Water		+0.7		+3.6		+0.6		+2.7		+0.6		+2.1		+0.2		+2.1		+0.3		+3.0

Table III—Perbunan-Cardolite 904 Compounds

Cure: 15 minutes at 325° F.

	A					B					C				
Perbunan 26 NS 95			100					—					—		
Perbunan 35 NS 90			—					100					100		
Cardolite 904			50					50					50		
Zinc oxide			5					5					5		
Sulfur			1.5					1.5					1.5		
Stearic acid			1.5					1.5					1.5		
Benzothiazyl disulfide			1.5					1.5					—		
n-Cyclohexyl-2-benzothiazole sulfenamide			—					—					1.5		
	H	T	E	M1	M2	H	T	E	M1	M2	H	T	E	M1	M2
Original	84	1200	350	620	810	81	1600	430	620	840	82	1880	510	690	870
Oven Aged for 70 hours at 212° F.	84	1140	210	—	—	84	1530	250	—	—	79	1730	290	—	—
Specific Gravity			1.079					1.093					1.091		
Crescent Tear Resistance, lb./in.			270					290					300		
Brittle Temperature, F.			—30					—10					—10		
Stiffness in Flex at 75° F., psi.			3240					3760					2580		
Immersed at Room Temperature, Hours		24		168			24		168			24		168	
Volume Increase, %, in															
A.S.T.M. Reference Fuel No. 1		+2.2		+5.7			+0.9		+2.7			+0.6		+2.6	
A.S.T.M. Reference Fuel No. 2		+42.7		+62.1			+35.5		+43.8			+18.1		+43.0	
A.S.T.M. Oil No. 3		+0.7		+1.3			+0.4		+0.6			+0.2		+0.3	
Water		+0.6		+1.8			+0.8		+1.9			+1.1		+2.5	

TABLE IV—PERBUNAN-PHENOLIC BLENDS WITH HYDROCARBON POLYMER AS TERTIARY COMPONENT

BASE RECIPE

Perbunan 35 NS 90	100
Zinc oxide	5
Sulfur	1.5
Stearic acid	1.5
Benzothiazyl disulfide	1.5
Resin	as shown

Cure: 15 minutes at 325° F.

	A			B			C			D		
Wilcorite R-10H	50			50			—			—		
Durez 13355	—			—			50			50		
S-50 Polymer	—			20			—			20		
	H	T	E	H	T	E	H	T	E	H	T	E
Original	80	2450	530	78	2260	560	59	2780	640	58	2720	650
		light brown			very light brown			light brown			very light brown	
Ultraviolet Light Aged for 150 hours at 125° F.	90	2180	390	84	2200	480	70	2330	390	71	2410	500
		dark brown			dark brown			dark brown			dark brown	
Specific Gravity		1.091			1.011			1.090			1.020	
Crescent Tear Resistance, lb./in.		320			390			340			410	
Brittle Temperature, F.		—10			—10			—10			—10	

Discussion of Results

A. *Perbunan-Phenolic Compounds Containing No Rubber Curatives:* The data on tensile and elongation presented in Figures 1 and 2 were obtained using Perbunan NS type polymers. Up to about 50% resin these compounds were leathery or rubbery in nature. They were compounded by first breaking down the Perbunan on differential rolls at 40° C. (four passes), then the resin was milled in. Test specimens were die cut from standard pads cured 15 minutes at 325° F.

The curves demonstrate the effect of increasing resin content on tensile strength and elongation. At 25 to 35 per cent resin the cured products resembled vulcanized rubber having tensile strengths in the range of 2000 pounds and elongations of 100 to 350 per cent. The molded finish of the materials was noted to improve as resin content increased. Up to 50 per cent resin the compounds had some extensibility and elasticity and exhibited many of the properties associated with rubber vulcanizates. As may be expected, those compounds containing resins of low reactivity exhibited poorer physical properties than those incorporating self-curing thermosetting phenolics.

Other physical properties which may be of interest in this type of compound are illustrated in Figure 3. Shore hardness, tear strength, stiffness and low temperature brittleness serve to emphasize the transition from rubber-like characteristics to resin as the phenolic content is increased.

B. *Perbunan-Phenolic Compounds Containing Rubber Curatives:* Conventional rubber compounding ingredients may also be used in rubber compounds containing phenolics with interesting results. The curves in Figures 4 and 5 illustrate physical properties of blends containing rubber vulcanizing agents. They show the excellent balance of high tensile strength and ultimate elongation obtainable. They indicate that conventional vulcanizing ingredients enhance the physical properties of the blends. Comparison of the curves with and without polymer vulcanizing agents demonstrates this forcibly. Additional data of this type are shown in Table III where Cardolite 904 (a new phenolic developed for this use) was employed.

By the same token that vulcanizing ingredients added to the blend are important, it should be mentioned again that activity of the resin is a major consideration. The manufacturer of Cardolite 899 and Cardolite 904 describes these two resins as being structurally the same with the exception that 5% of combined hexamethylene tetramine is present in the latter stock. The effect of

TABLE V—PERBUNAN 35 NS 90-PHENOLIC BLENDS CONTAINING LOADING AND PLASTICIZERS

BASE RECIPE

Perbunan 35 NS 90	100
Zinc oxide	5
Stearic acid	1
n-cyclohexyl-2-benzothiazole sulfenamide	1
Sulfur	1.5
Calcene	30
Silene EF	50
Calcium oxide (Merck NF)	3
Resin	as shown
Plasticizer	as shown

Cure: 15 minutes at 325 F.

	A				B				C				D				E				F			
Monsanto 378	35				—				35				35				35				—			
Cardolite 904	—				35				—				—				—				35			
Cumar P-25	—				—				15				—				—				—			
Dibutyl phthalate	—				—				—				15				—				—			
S-50 Polymer	—				—				—				—				15				15			
	H	T	E	M1	H	T	E	M1	H	T	E	M1	H	T	E	M1	H	T	E	M1	H	T	E	M1
Original	80	1850	360	540	80	1810	500	560	66	1930	490	370	78	1200	360	450	89	1910	410	680	85	1570	530	550
Specific Gravity		1.389				1.361				1.363				1.378				1.322				1.309		
Crescent Tear Resistance, lb./in.		330				330				320				280				380				360		
Brittle Temperature, F.		—10				—10				0				—30				—10				—10		

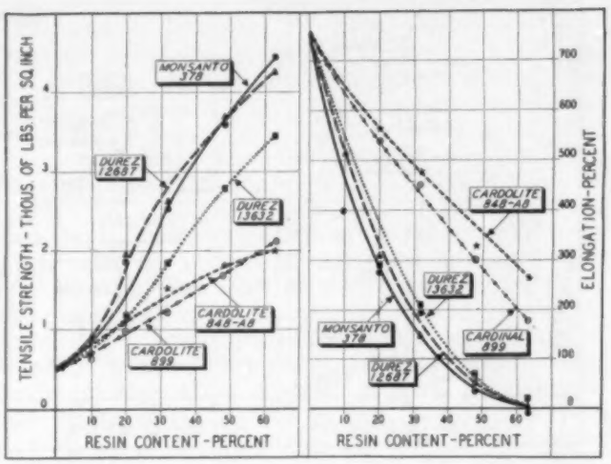

FIG. 4—Resin-Perbunan 26 NS, 100; Zinc Oxide, 5; Stearic Acid, 1; Sulfur, 2; n-Cyclohexyl-2-benzothiazole sulfenamide, 1. (Cure: 15' @ 325°F.).

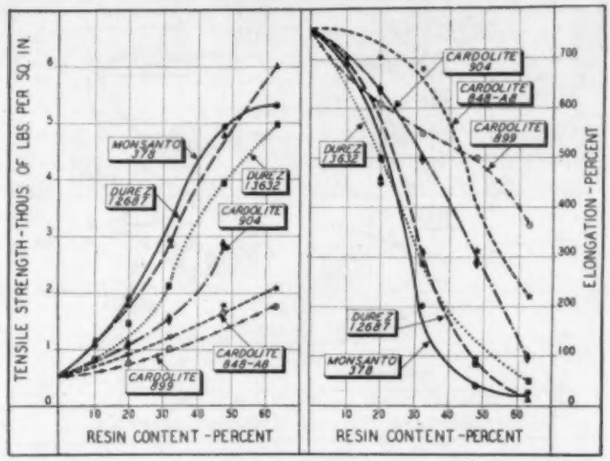

FIG. 5—Resin-Perbunan 35 NS90, 100; Zinc Oxide, 5; Stearic Acid, 1; Sulfur, 2; n-Cyclohexyl-2-benzothiazole sulfenamide, 1. (Cure: 15' @ 325°F.).

the added accelerator may be seen in Figure 5. The 904 blends show higher tensile and lower elongation than the 899 blends.

C. *Effect of Acrylonitrile Content:* Initial investigations demonstrated that the higher acrylonitrile content Perbunan 35 gave better co-vulcanizates with the thermosetting resins than either Perbunan 26 or Perbunan 18. The co-vulcanizate quality was judged by tensile strength, solubility, appearance, etc. This is aptly illustrated by comparing the curves on Perbunan 26 in Figures 1 and 4 with Perbunan 35 in Figures 2 and 5.

Depending on the product properties required other considerations might be weighed in selecting a polymer having an acrylonitrile content contributing to a judicious balance of properties. For example, Figures 6 and 7 show the general trend of physical properties of compounds having fixed resin content and variable acrylonitrile in the synthetic rubber. It is possible to visualize applications where Perbunan 26 would be selected in preference to Perbunan 35 in spite of lower tensile properties merely because the former produces improved low temperature properties. In other applications requiring excellent oil resistance Perbunan 35 might be preferred. Similarly, Perbunan 18 may be desired for some specific requirements, such as superior low temperature properties.

D. *Perbunan - S - Polymer - Phenolic Blends:* It has been noted previously that S-polymers improve the processability of phenolic-Perbunan blends. Other observations indicate that additional advantages may be obtained. These are illustrated in Table IV. The improved properties included tear strength, elongation, and aging. It is significant that inasmuch as S-polymers are saturated polymers they do not affect the curing times of phenolics or phenolic-Perbunan blends.

Tables V and VI show the effect of some plasticizers (including S-polymers) on the physical properties of clay loaded Perbunan-phenolic compounds. The mineral filled Perbunan-resin blends exhibited interesting leather-like characteristics. The products may be press polished to give very high gloss. After the resins have been blended with Perbunan and reacted the resins have a phenol odor. However, after prolonged standing in air the odor disappears. The most interesting point brought out by this work is that S-polymer improves the tear resistance. It was also discovered that in the molding operation those compounds containing S-polymers could be removed without cooling from the hot

TABLE VI—PERBUNAN 26 NS 95-PHENOLIC BLENDS CONTAINING LOADING AND PLASTICIZER

Base Recipe	
Perbunan 26 NS 95	100
Zinc oxide	5
Stearic acid	1
n-cyclohexyl-2-benzothiazole sulfenamide	1
Sulfur	1.5
Calcene	30
Silene EF	50
Calcium oxide (Merck NF)	3
Resin	as shown
Plasticizer	as shown

Cure: 15 minutes at 325 F.

	A				B				C				D				E				F			
Monsanto 378	35				—				35				35				35				—			
Cardolite 904	—				35				—				—				—				35			
Cumar P-25	—				—				15				—				—				—			
Dibutyl phthalate	—				—				—				15				—				—			
S-50 Polymer	—				—				—				—				15				15			
	H	T	E	M1	H	T	E	M1	H	T	E	M1	H	T	E	M1	H	T	E	M1	H	T	E	M1
Original	73	1770	460	290	72	1440	600	440	70	1060	440	360	60	1410	570	180	73	1550	550	250	77	1250	640	370
Specific Gravity		1.343				1.352				1.343				1.349				1.298				1.290		
Crescent Tear Resistance, lb./in.		260				270				270				250				300				340		
Brittle Temperature, F.		—30				—30				—30				—40				—30				—20		

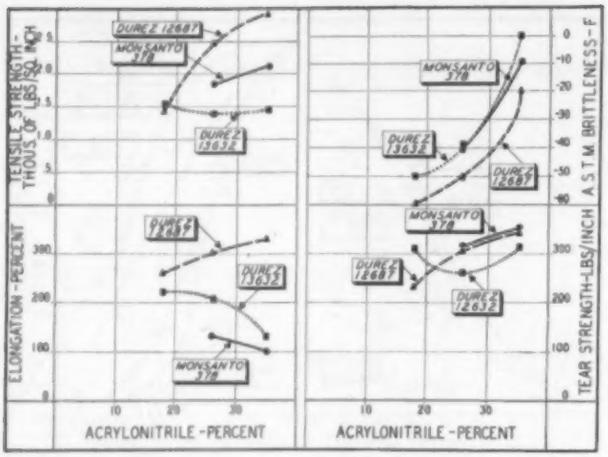

FIG. 6—Perbunan, 100; Phenolic Resin, 50; Zinc Oxide, 5; Stearic Acid, 1.5; Sulfur, 1.5; Benzothiazyl disulfide, 1.5. (Cure: 30' @ 325°F.).

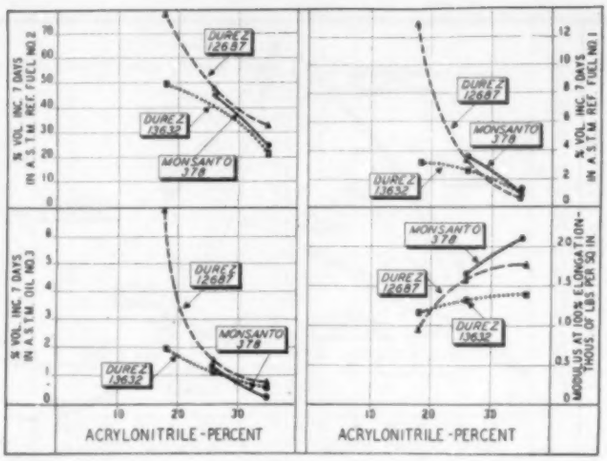
% VOL. INC. 7 DAYS IN A.S.T.M. REF. FUEL NO. 2
% VOL. INC. 7 DAYS IN A.S.T.M. OIL NO. 3
% VOL. INC. 7 DAYS IN A.S.T.M. REF. FUEL NO. 1
MODULUS AT 100% ELONGATION-THOUS. OF LBS. PER SQ. IN.
DUREZ 12687
DUREZ 13632
MONSANTO 378
ACRYLONITRILE-PERCENT
ACRYLONITRILE-PERCENT

FIG. 7—Perbunan, 100; Phenolic Resin, 50; Zinc Oxide, 5; Stearic Acid, 1.5; Sulfur, 1.5; Benzothiazyl disulfide, 1.5. (Cure: 30' @ 325°F.).

molds; compounds not containing S-polymers were difficult to remove unless the molds and contents were cooled prior to any attempts to remove the product.

E. *Perbunan in Phenolic Molding Compounds:* Thus far the data presented have been for the most part on rubber-like compositions. In Table VII data are tabulated on some molding compounds where the concentration of resin is relatively high as compared to Perbunan. The results indicate that improved impact resistance is obtained through the use of Buna N rubber. In all cases Perbunan 35 was superior to Perbunan 26. This was true in tensile strength, compression strength, flexure strength and heat of distortion.

Conclusions

The foregoing work presents a number of possibilities, opening up new and attractive fields for phenolics or condensation polymers. It has been seen that by careful selection of Perbunan polymers, taking into consideration the chemical composition (% acrylonitrile), and judicious blending of these elastomer plasticizers with phenolics, fillers, and vulcanizing agents, many interesting and valuable formulae can be developed. These range from the rigid structurally strong types suitable for radio cabinets, camera covers, tool handles, electrical panels, etc., to the flexible varieties which might find extensive applications in artificial leathers, electrical insulation, protective sheets, and the like.

The S-polymers, new and interesting thermoplastic saturated hydrocarbon resins, demonstrate unique advantages blended in condensation polymers improving the processability and tear strength. Artificial leathers fabricated from such blends would possess long service life, flexibility, and great strength.

It is believed that these experiments demonstrate only a few of the possibilities in this field. It is hoped, however, that the work may be of value to both the resin and rubber industries and that it will stimulate many more studies of these materials whose properties compliment each other so admirably. The work thus far indicates that with each successive investigation the field will continue to broaden and become of greater and greater importance to those industries so closely related—rubber and plastics.

TABLE VII—EFFECT OF PERBUNAN ON PHENOLIC MOLDING COMPOUNDS

Cure: 60 minutes at 300° F.

	A	B	C	D	E
Wood Flour (DNE)	100	100	100	—	—
Monsanto 378	100	70	70	100	100
Perbunan 26 NS 95	—	—	30	—	50
Perbunan 35 NS 90	—	30	—	50	—
Rockwell Hardness	M-67	M-49	M-23	M-94	M-27
Tensile Strength, psi.	2420	2930	2280	5120	2160
Compression Yield:					
Deflection at Ultimate Break, %	very slight	4.8	6.3	31.3	19.1
Ultimate Break, psi.	5960	9510	4800	21,000	7570
Flexural Strength, psi.	4290	5260	3190	7820	3780
Impact Strength (Izod), ft-lb/in. of notch	0.08	0.89	0.71	0.66	0.50
Heat of Distortion, C.	128	118	92	97	64
	F	G	H	I	J
Wood Flour (DNE)	100	100	100	—	—
Durez 12687	100	70	70	100	100
Perbunan 26 NS 95	—	—	30	—	—
Perbunan 35 NS 90	—	30	—	50	100
Rockwell Hardness	M-69	M-90	M-75	R-109	R-68
Tensile Strength, psi.	6000	7750	5270	3800	2590
Compression Yield:					
Deflection at Ultimate Break, %	very slight	12.0	11.1	15.6	56.2
Ultimate Break, psi.	7900	19,800	15,700	17,800	20,200
Flexural Strength, psi.	12,000	13,600	9460	6920	4480
Impact Strength (Izod), ft-lb/in. of notch	0.31	0.56	0.40	0.83	4.0
Heat of Distortion, C.	129	121	123	52	41

Summary

Results are presented on the plasticization of phenolic resins by the use of several synthetic elastomers such as Perbunan (NS), polybutadiene, and S-polymers. The Perbunan (NS) polymers are a commercial class of butadiene - acrylonitrile copolymers stabilized with a non-toxic and non-staining antioxidant. The S-polymers are copolymers that contain styrene. In the investigation about 50 thermosetting rubber-resin compounds were made on a laboratory rubber mill. The tests carried out on most of the compounds included: 100% modulus, tensile strength, ultimate elongation, crescent tear, Shore durometer hardness, Rockwell hardness, heat of distortion, Izod impact, flexural strength, compressive strength, rupture compression, brittle temperature, specific gravity, weight loss, heat aging at 212° F., light aging, and volume increase in A.S.T.M. Reference Fuels No. 1 and No. 2, A.S.T.M. Oil No. 3, and water.

Results indicate that up to about 50% resin these compounds are rubbery or leathery. As the resin content is increased above 50%, the compounds are no longer extensible and rubbery. The effect of the rubber is, however, still pronounced on the impact strength, and brittle temperature. Perbunan-18-phenolic leather-like compounds were formulated that had a brittle temperature below —70° F. Some of the compounds were light yellow in color. The advantages obtained by using S-polymers in the Perbunan-phenolic blends are: (1) Improved processing properties, (2) Better oven aging characteristics, (3) Increased crescent tear values, and (4) Improved color.

ACKNOWLEDGMENTS

The advice, encouragement, and assistance of Messrs. E. N. Cunningham, B. M. Vanderbilt and L. B. Turner, during the course of this work, were greatly appreciated

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NOTE: This paper was presented before the Division of Paint, Varnish, and Plastics Chemistry at the 112th Meeting of the American Chemical Society, New York, N. Y., September, 1947.

Report on German Polyvinyl Chloride Paste Dispersions

COATED fabrics, shoe soles and surgeons' gloves were made in Germany in large quantities from polyvinyl chloride paste dispersions, according to a report issued by the Office of Technical Services of the Department of Commerce. The report by OTS investigator Clayton F. Ruebensaal describes the fabricating of plasticized polyvinyl chloride articles by means of resin dispersions in plasticizer.

Paste dispersions had virtually replaced solvent coatings of fabrics in Germany and had opened up new methods of employing plasticized polyvinyl chloride that had not been formerly possible, Mr. Ruebensaal reports. The state of development of these dispersions was much more advanced and the range of applications of greater scope than used in the United States, he adds.

The report contains information on the general properties of paste dispersion components, plasticizers, and methods of manufacture. The investigator reports that one of the principal advantages of these pastes when used for coated fabrics was the fact that the film adhesion to the cloth backing was superior to calendered coatings. Thin coatings are usually applied in the United States to provide good adhesion of calendered coatings.

I. G. Farbenindustrie, A. G., at Bitterfeld was the sole manufacturer and supplier of polyvinyl chloride resin pastes. Although experimental quantities of many different formulations were made, the 7,000,000 pound annual production consisted mainly of four types, known respectively as paste "F" for cheap general purpose, "M" for general purpose, "K" for cold resistance and "C" for harder products. The pastes were sold in 12 and 15 metric ton shipments and delivered in insulated iron tank cars. Some of the larger users put in their own paste-making equipment about 1944 because of the simplicity of working with the pastes. Several operations in paste-making are described in the report.

Details on seven different types of plasticizers used for the pastes, only one of which is well known in the United States, appear in the report. Among the plasticizers are "Plastomoll TAH" (thiodibutyric acid ester of ethyl hexanol), considered to be the best plasticizer for polyvinyl chloride developed in Germany, "Mesamoll I" (esters of phenol and sulfonic acid chlorides derived from Fischer-Tropsch hydrocarbons), which resemble tricresyl phosphate known in the United States. Mesamoll's cold resistance is better, but it is also more volatile and water sensitive than tricresyl phosphate. Good mechanical strength with high proportions of softener and good resistance to heat makes it especially well suited for pastes, the investigator reports.

The report contains several tables giving viscosity data on plasticizers and paste formulations of the four chief types. A table of designations of 10 polyvinyl chloride resins gives the name of the resin, its use, "K" value and catalyst.

An appendix listing German plants reveals that nine use polyvinyl chloride paste dispersions for coated fabrics, three for belts for power-driven machinery, two for shoe soles, two for dipped goods such as gloves and boots, three for paint rolls, two for coated jute shipping bags, and two for making sponge.

Mimeographed copies of the report ("Paste Dispersions of Polyvinyl Chloride," Report No. PB-77673, 16 pages plus tables) sell for 50c per copy. Orders should be addressed to the Office of Technical Service, Department of Commerce, Washington 25, D. C., and should be accompanied by check or money order made payable to the Treasurer of the United States.

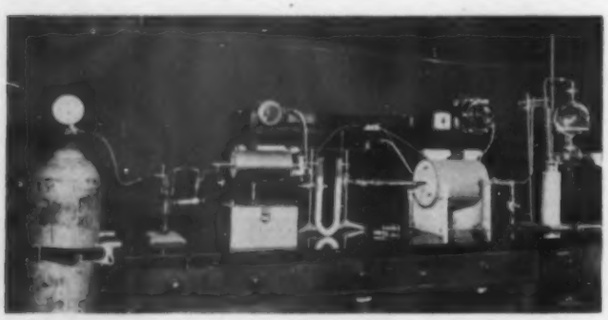
Direct Determination of Oxygen in Organic Compounds

AN improved technique for the direct determination of oxygen in high-molecular weight organic compounds has been developed by W. W. Walton, F. W. McCulloch and W. H. Smith of the National Bureau of Standards, Washington, D. C. By this method, small amounts of oxygen, such as occur in natural and synthetic rubbers, in plastics prepared from hydrocarbons, and in mineral oils, can be measured with precision and accuracy. Essential features of the procedure are thermal decomposition of the sample in an atmosphere of oxygen-free helium and conversion of the resulting oxygen compounds to carbon monoxide by passage of the products over carbon at 1120°C. The oxygen content of the material is then calculated from the percentage by volume of carbon monoxide in the collected gas as determined by the NBS Carbon Monoxide Indicator.

In the analysis of organic compounds, the amounts of elements other than oxygen have always been determined directly, while that of oxygen has been determined by difference. The value for oxygen obtained in this way, involving an accumulation of possible errors in the determinations of the other elements, has proved reasonably satisfactory in investigations of the structure of compounds of low molecular weight. However, for the analysis of compounds of high molecular weight or of substances containing very small amounts of oxygen, greater accuracy becomes necessary.

In recent years, the need for a direct oxygen method has been especially pronounced in the fields of high-polymer plastics and synthetic rubber. Oxygen determination is important, for example, in studying the effects of various agents added to retard aging of rubber and in ascertaining the influence of small amounts of oxygen on the physical properties of this substance relative to processing and vulcanization, as well as in the basic study of the composition of the polymer. Likewise, in the analysis of synthetic rubber there is need for extremely close agreement among values obtained by various laboratories in order that rubber produced by different plants may be interchangeable.

The procedure developed at the Bureau is a modification of the micro method developed by Unterzaucher (*Ber. Deut. Chem. Ges.*, Vol. 73-B, p. 391-1940). It is expected to aid materially in this work, and it is believed that the method may be readily adapted to analysis of compounds containing large amounts of oxygen.



Apparatus developed by NBS for the direct determination of small amounts of oxygen in organic compounds.

The apparatus consists primarily of a helium tank with pressure regulator, a furnace at 400°C, packed with copper spirals through which the helium is passed to remove oxygen, a U-tube filled with ascarite and a drying agent to absorb carbon dioxide and moisture from the helium, a quartz tube having a section packed with carbon pellets, a tubular furnace enclosing that section of the quartz tube and heated to 1120°C., and a flask of accurately measured volume in which the carbon monoxide is collected.

The apparatus is arranged so that a continuous stream of helium is passed over the heated copper and through the drying agents into the quartz tube. After the weighed sample has been placed in the entrance end of the tube on a platinum boat, air is swept out of the system by means of a reverse stream of heated helium for two hours. The flow of helium is then directed forward through the high-temperature furnace toward the collecting flask.

The sample is burned by slowing advancing a Bunsen burner and a gauze mantle along the section of the quartz tube containing the platinum boat. This operation, requiring about 10 minutes, is repeated to insure complete decomposition of any particles that may have sublimed to other parts of the tube.

The products of pyrolysis pass with the helium over the hot carbon in the furnace and through a liquid air trap to the collection flask, where water is gradually displaced by the mixture of gases. After a given volume of gas has been collected, as measured by the water level in a capillary, the collecting flask is disconnected and a stopcock opened momentarily, allowing a small amount of air to flow into the flask to restore atmospheric pressure. To determine the percentage by volume of carbon monoxide in the collected gas, the flask is connected through a flow meter to an NBS carbon monoxide indicating tube, which contains a colorimetric indicating gel capable of detecting and estimating less than 1 part of carbon monoxide in 500 million parts of air.

After the gas has passed through the tube at the rate of 70 ml per minute for a definite period, the color shown by the indicating tube is compared visually with standard tubes prepared at the same time by passing known amounts of carbon monoxide through them. From the value obtained for the volume concentration of carbon monoxide in the collected gas, the volume of the gas (which is known by previous calibration of the flask), the density of carbon monoxide, and the weight of the sample, it is possible to calculate the percentage of oxygen in the material.

This method has been used with excellent results at the Bureau in the analysis of compounds containing less than two percent of oxygen, and it is expected that with some modification the procedure may be used in the analysis of materials containing higher percentages of the element. Since accurate determination of carbon monoxide in large quantities is not practicable, the carbon monoxide might first be oxidized to carbon dioxide, which could then be measured by standard methods.

Testing Reclaimed Rubber

By F. L. KILBOURNE, Jr.

Chief Chemist, Xylos Rubber Co., Akron 1, Ohio

THE Technical Committee of the Rubber Reclaimers' Association adopted a simple test formula for reclaimed rubber in October, 1942. The reason for doing this was to promote uniformity throughout the industry in discussion of reclaimed rubber specifications. Many technologists had previously decried the use of the simple five per cent sulfur test formula. Palmer and Crossley[1] summarized the literature on this subject. The Reclaimers' Test Formula, though hurriedly adopted for the sake of uniformity during the war period, has now stood the test of time and has had fairly general acceptance on its merits.

Reclaimers' Test Formula

The formula is as follows:

Reclaimed Rubber Hydrocarbon	100.0
Zinc Oxide	5.0
Stearic Acid	2.0
Sulfur	3.0
Mercaptobenzothiazole	0.5
Diphenylguanidine	0.2

Cure 10, 15, 20, 25, etc., minutes at 40 pounds psi (287° F.) until optimum cure is reached.

As originally adopted, the rubber hydrocarbon referred to in the above formula was supposed to be measured by the Direct or Chromic Acid Oxidation method. Since this method gives results which are always a few per cent lower than those obtained with the Indirect or Difference method of analysis, this laboratory and most of the trade have used the rubber contents as determined by the Indirect or Difference method for setting the test formula.

In order to use the test formula, it is necessary to know the rubber content of the reclaim. This is usually known in advance or is available by asking the reclaim manufacturer. Thus, if the rubber content is 50 per cent, one uses 200 parts of reclaim to obtain 100 parts of reclaimed rubber hydrocarbon in the formula. When a quick test is needed, one can estimate the rubber content from the specific gravity. Typical specific gravity and corresponding rubber content ranges are shown in Table I.

[1] *Ind. Eng. Chem., Anal. Ed.*, Vol. 13, p. 154 (1941).

TABLE I—APPROXIMATE RUBBER CONTENTS

Spec. Grav. Range	Type of Reclaim *	Estimated Rubber Content
1.10-1.15	Tube or Carcass	60-70
1.15-1.20	Tube	55-65
1.15-1.20	Tire	45-55
1.15-1.20	Black Carcass	50-55
1.20-1.25	Tire	40-50
1.20-1.25	Lt. Carcass	50-55
1.25-1.30	Tire	35-45
1.30-1.35	Mechanical	35-40
1.35-1.40	Mechanical	30-35

* In general, a synthetic reclaim will contain slightly less hydrocarbon than the corresponding natural rubber reclaim because of the prevalent use of higher black loadings and increased softeners when compounding synthetic rubber.

TABLE II—DETAILED TEST FORMULA

Pigment Weighings

	100 Parts Basis	Actual Weights
Zinc Oxide	5.0	25. grams
Stearic Acid	2.0	10. grams
Sulfur	3.0	15. grams
Mercaptobenzothiazole	0.5	2.5 grams
Diphenylguanidine	0.2	1. gram

Reclaimed Rubber Weighings

For reclaim with 62.4-67.5% rubber content, use	770 grams
For reclaim with 57.5-62.4% rubber content, use	835 grams
For reclaim with 52.5-57.4% rubber content, use	910 grams
For reclaim with 47.5-52.4% rubber content, use	1000 grams
For reclaim with 42.5-47.4% rubber content, use	1110 grams
For reclaim with 37.5-42.4% rubber content, use	1250 grams
For reclaim with 32.5-37.4% rubber content, use	1430 grams
For reclaim with 27.5-32.4% rubber content, use	1667 grams

Variations of Formula

In the laboratories of the Xylos Rubber Company, the Reclaimers' Test Formula is broken up into several subformulas, each of which covers a range of rubber contents. This requires the weighings shown in Table II to obtain batches which, expressed in grams, are five times the base formula.

By using Table II, one needs only a single formula card for pigments. Thus, error in weighing pigments is reduced to a minimum. Each reclaim that is tested frequently has a known rubber content and the appropriate weight of reclaim to be used is quickly selected by reference to the table. For unknown reclaims, the compounder must indicate the amount of reclaim to be used in the test.

Instead of the above procedure, one may standardize on a given quantity of reclaim and have several different formulas for the weights of pigment corresponding to the various rubber contents. In either case, it is felt that some grouping of reclaims with similar rubber contents such as is shown in Table II is needed to facilitate testing when a large number of tests are being run. The maximum error in accelerator, sulfur, zinc oxide and stearic acid concentrations that can be incurred by this grouping of reclaims is 8.3 per cent of the formulated amount at the 30 per cent hydrocarbon level and only 3.9 per cent at the 65 per cent hydrocarbon level.

TABLE III—DUPLICATION OF RESULTS

	Stress @ 300% (lbs.)	Elong. (%)	Tensile (lbs.)	Shore Hard.
Whole Tire Reclaim (Cured 25 min. @ 287° F.)				
Mixing No. 1	640	375	865	55
Mixing No. 2	630	365	885	55
Mixing No. 3	635	360	895	54
Mixing No. 4	635	375	875	53
Mixing No. 5	645	370	905	54
Black Tube Reclaim (Cured 15 min. @ 287° F.)				
Mixing No. 1	680	525	1620	55
Mixing No. 2	665	565	1705	55
Mixing No. 3	685	525	1660	55
Mixing No. 4	680	545	1690	55
Mixing No. 5	695	555	1690	55
Average for whole tire reclaim	637	369	885	54
Average deviation, %	0.6	1.4	1.4	—
Average for black tube reclaim	681	542	1673	55
Average deviation, %	1.3	2.8	1.6	—

Some laboratories simplify the weighing of batches even further by blending together all the dry pigments except stearic acid, sifting the mixture to prevent formation of agglomerates, and then making one weighing take the place of four. The stearic acid and reclaim are then weighed separately.

Preparation of Batches

The batches given in Table II are weighed out for a large laboratory mill with rolls 16 inches by 8 inches with a 3 to 1 ratio between fast and slow rolls. For smaller mills, the batch size is adjusted accordingly. The mill is operated at a speed of 21 rpm on the fast roll and 14 rpm on the slow roll. The opening of the mill is adjusted to produce a smooth rolling bank about 1 to 2 inches in diameter. The reclaim is put on the mill and given a breakdown period of two minutes. In the case of dry or nervy reclaims, a longer breakdown time is necessary.

The stearic acid and zinc oxide are added and mixed for one minute. The sulfur and accelerators are then added and the batch allowed to mix 1.5 minutes. At this point (total time 4.5 minutes) the batch is given two refining passes at a thickness of 0.050 ± 0.010 inches. The batch is then taken off of the mill and the weight is checked. Next, it is passed through the mill end-wise four times at a thickness of 0.250 inches. The batch is then allowed to roll on the mill at a thickness of 0.110 ± 0.010 inches for at least 0.5 minutes to establish a grain and it is then slabbed off. The mixing procedure should require about 6.5 minutes. The variation between successive mixings is shown in Table III.

ASTM Procedures Followed

The results given in Table III were obtained by following testing procedures recommended by the ASTM (D412-41). Three strips were broken for each cure. The breaking of at least three strips is recommended. The results of all three strips are averaged unless one strip falls more than ten per cent below the highest of the other two. In this case, the results on the two best strips are averaged. If the two poorest strips both fall more than ten per cent below the best strip, additional strips are broken until two are found which agree within ten per cent.

Typical test results for several types of reclaim are shown in Table IV. Most of these results were obtained on reclaims made by one manufacturer although a few tests on other reclaims are included. Many of the values shown are averages over a period of one year.

Summary

1. A new test formula for reclaimed rubber based on the percentage of rubber hydrocarbon in the reclaim has been in use since 1942.
2. Details of the mixing and a simplified program for testing a large number of reclaims have been outlined.
3. The test formula gives consistent results in the hands of experienced technicians.

TABLE IV—TYPICAL RECLAIM PHYSICAL TESTS

Type	Specific Gravity	Cure	Stress @ 300%	Elongation	Tensile	Shore Hardness
Synthetic Whole Tire	1.19	35'@312°	575	425	965	47
Mixed Natural and Synthetic Whole Tire	1.20	25'@287°	650	400	900	54
Mixed Natural and Synthetic Peelings	1.26	25'@287°	720	320	1060	50
Natural Peelings	1.16	20'@287°	1095	325	1265	53
Black Tube	1.18	20'@287°	565	520	1460	55
Light Carcass*	1.22	10'@287°	270	630	1245	44
Modified Tire	1.24	20'@287°	1200	300	1200	63
Modified Tire	1.24	20'@287°	600	305	625	56
Mechanical Blend	1.33	25'@287°	520	320	650	55
Mechanical Blend	1.40	25'@287°	——	265	725	64
Light Colored Mechanical Blend	1.39	20'@287°	425	485	960	53
Modified Tire	1.27	20'@287°	750	380	1030	62
Modified Tire	1.27	20'@287°	420	500	740	58
Mixed Natural and Synthetic Whole Tire	1.19	25'@287°	710	400	1070	54
Mixed Natural and Synthetic Whole Tire	1.18	25'@287°	690	365	890	51
Mixed Natural and Synthetic Whole Tire	1.20	20'@287°	500	470	1050	54

* In testing highly alkaline reclaims such as this one, it has been found necessary to replace the 5.0 parts of zinc oxide and 2.0 parts of stearic acid with 5.0 parts of zinc laurate. Apparently, the alkali in the reclaim interferes with the normal action of zinc oxide and stearic acid during devulcanization.

Reduction of Wear in Rubber Stern Bearings by the Flow Controlled Continuous Film Method

By R. D. SMEALLIE

General Manager, Willis Rubber Bearing Division, E. J. Willis Co., 91 Chambers St., New York 7, N. Y.

DURING World War II, landing craft propeller shaft bearings and shafting were a costly and time consuming maintenance problem. In peace-time, the condition is parallel in many parts of the world where vessels are forced to operate in shallow waters heavily laden with sand, silt, coal screenings and coral—all of which are conducive to excessive shaft or shaft liner and bearing wear.

In attacking the problem of minimizing maintenance from this natural hazard, it became apparent at once, that not only was a complete mechanical change inevitable, but that the technique of lubrication also must be overhauled to greatly increase the sand ejection rate within the bearing.

Mechanical Change Involved

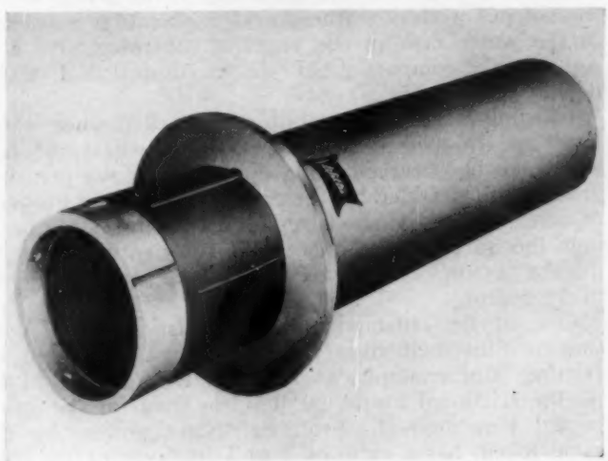
The first mechanical change toward the objective was an important step in shaft conservation and consisted of combining the shaft sleeve and bearing as an integral one piece unit. In pursuing this step, the shaft sleeve with its molded rubber covering was locked to, and rotated with the shaft, the "rotary journal" using for its opposite frictional surface a stationary renewable bronze bushing. This type of rubber bearing, although not of a continuous film construction at that time, was used very successfully throughout the war for propeller shaft bearings on landing craft.

The next advanced step was based on a study of hydrodynamics which brought to light a little used law of physics involving the action of a submerged shaft rotating under water at various loads and speeds.

As a result of the study, it was determined that the internal action of a submerged bearing took on a definite pattern of a vacuum-pressure cycle which when analyzed, was observed to set up a dual action of pressure and vacuum for each 180° of a revolution. This double cycle has now been developed to produce several factors which heretofore seem to have been entirely neglected in the design of marine stern bearings.

It became clear that the primary requisite was to block all film "pressure escape points" having their origin within the loaded section of the bearing. The first apparent advantage was the formation of a *continuous* lubrication film which, in effect, allowed the build up of a perfect water wedge. This was highly desirable inasmuch as it afforded a very high degree of "shaft flotation." Separating the frictional surfaces by this uninterrupted water wedge materially reduced the coefficient of friction at practically all speeds with particular emphasis at low speed where shaft and bearing damage is at its most critical point.

A definite proof of complete shaft flotation widened



View of the Willis Rubber Bearing

itself by the fact instead of the maximum wear point being 12 to 15 degrees ahead of the dead center (in direction of rotation) the effected water wedge had actually picked up the shaft and changed its maximum point of wear to approximately 15 degrees *after* passing through dead center. Thus a change of nearly 30 degrees took place in the maximum wear point between the continuous film and non-continuous film method of lubrication.

Fundamental of Lubrication

Following further reactive results, it was found that as soon as the shaft speed was sufficiently high to effect shaft flotation, an important and pronounced sequence occurred. For example, assuming a point diametrically opposite the maximum load, the generated film pressure between frictional surfaces was zero. Progressing in the direction of rotation, consecutive readings taken on a compound gauge showed increasing pressure until it arrived at its greatest value directly in the maximum loaded area. This action is a long recognized lubrication fundamental which has been disregarded, almost without exception, in the present day design of stern bearings.

Passing through the next 180° cycle, the pressure, within a few degrees after having passed through the maximum loaded area, had reverted to a maximum vacuum which decreased in the direction of rotation until it completely subsided at the original starting point. This dual cycle repeated itself on each revolution of

the shaft and merely reversed the pattern of action when the shaft was rotated in the opposite direction.

The following step, however, was an entirely new conception of rapid sand removal and a direct result of applying theories known to exist in the double pressure-vacuum cycle briefly described above.

By placing two axial "flow control" grooves running from end to end on the inside periphery of the mating bronze bushing—one in the pressure area and one in the vacuum area—advantage was taken of the hydrodynamically developed pressure and vacuum values. Sand and water were taken in on the vacuum cycle while sand and water was also discharged under pressure during the pressure cycle. Both actions were simultaneous and occurred with each revolution of the shaft and will duplicate the action in either direction of rotation.

Part of the phenomena occurring in the action somewhat defies a clear mathematical explanation inasmuch as the water flow in the pressure control groove is a right angle component of the circumferential water flow.

Existing proof of the action may be cited when water levels are dropped to the center line of the bearing when water can be observed being ejected from the pressure groove with considerable force while the vacuum grooves, of course, show no discharge. When testing large bearings the vacuum action becomes sufficiently violent to draw a person's hand against the intake area at the ends of the bearing.

One of the outstanding characteristics of the continuous film method is its lower static coefficient of friction. For example, at 100 rpm with a load of 30 psi the frictional torque is 50% less than for the interrupted film method. Frictional horse power, by the same token, has a ratio of 2 to 1 in favor of the continuous film method.

To contribute further to low static frictional characteristics at low speeds, axial water traps or reservoirs are designed in the form of molded grooves placed in the rotary rubber journal. The grooves in the rubber tend to supply a constant source of additional water under pressure regardless of how slowly the shaft may rotate. The slow speed grooves are blocked at both ends to prevent water and film pressure escape through the ends of the rotor grooves while operating in the loaded area.

Considering the four major factors of design—continuous film lubrication, automatic sand ejection, slow speed water feed and shaft conservation—the results manifested themselves very effectively at the end of 72 hour destructive tests. The depth of scouring in the metal bushing took on an even depth which was approximately 70% shallower than for the non-continuous film type score lines being barely perceptible to the finger nail.

When running parallel tests on several types of interrupted film, non-flow control type bearings, the wear progressed through to the housing causing the test to be discontinued as inoperative. The continuous film flow controlled bearing still had 42% life remaining, practically all wear being taken on the renewable metal bushing and less than .001 of an inch on the rubber. The shaft itself, because of its integral rubber covered shaft sleeve, was preserved in its original state.

Continuous film lubrication is of unquestionable engineering value and has been used for many years in the operation of high speed turbine bearings, reduction gear units and various heavy duty industrial bearing uses. This method of lubrication combined with automatic sand ejection, slow speed water feed to frictional surfaces and complete preservation of shafting, bids fair to the establishment of a new low in maintenance costs.

NOTE: This paper was presented at the Symposium on Non-Metallic Bearings held by the Rubber & Plastics Division, A.S.M.E., at Atlantic City, N. J., on December 4, 1947.

Goodman Rubber Cutting Machine

INCLUDED in the line of new rubber machinery and equipment recently developed and introduced by G. F. Goodman & Son, Richmond Street and East Columbia Ave., Philadelphia 25, Penna., is the rubber cutting machine illustrated herewith. The only manual labor involved in the operation of this machine is the initial feeding of the extruded rubber strands and keeping them tangle-free and accordingly one operator can run three machines. Each machine is supplied with two sets of knives for elimination of shut-down time for sharpening.

The Goodman Rubber Cutting Machine is available in two models—the 10 strand and 25 strand cutting machines. The 10 strand machine is designed to cut slugs of extruded rubber suitable for loading mold cavities individually. The feed rolls will accommodate 10 strands of extruded rubber up to ½-inch in diameter. The slugs are cut at the rate of 1,000 per minute, and their length can be varied from ½ to 1½ inches.

The 25 strand machine is built to deliver the multitude of pellets required by high production loading of small diameter and deep cavity molds. The rubber strands, 3/16ths of an inch in diameter, are placed in the feed rolls and pass through the knives at a rate of 7500 pellets per minute. The length of the pellets can be varied from ⅛ inch to ⅜ths of an inch by means of a simple adjustment.

Front view of rubber cutting machine showing feeder plate leading to feed rolls and knives.

Design and Construction of Arc Welded Steam Platens

By H. O. LEHMAN

Engineering Dept., Firestone Tire & Rubber Co., Akron 17, Ohio

The following data and illustrations are from a study submitted to the James F. Lincoln Arc Welding Foundation by the author in the recent $200,000 Design-for-Progress Award Program for reports and advances and improvements made by the applications of arc welding in design, fabrication, construction and maintenance. This study won an award in the Industry Machinery Division.—Editor.

THE Firestone Tire and Rubber Company is one of the world's largest manufacturers of rubber, plastic, and plywood products. One of the most important operations in the manufacture of these products is the molding or curing. This operation is performed on a suitable hydraulic press by the application of pressure and heat. The conventional heat transfer medium is a steam heated platen. Due to the company's large scale activities, these platens are an item of considerable expense when manufactured in the conventional way.

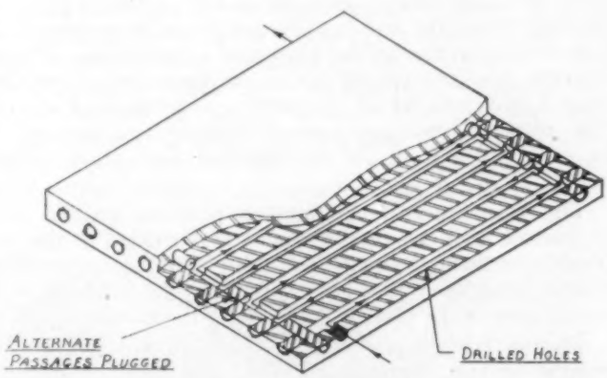


FIG. 1—Conventional method of steam platen construction.

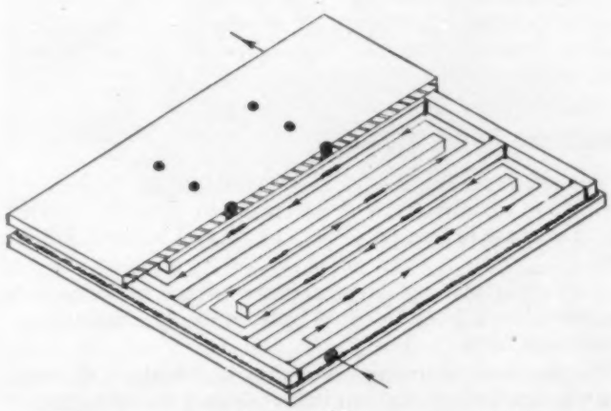


FIG. 2—Arc welded method of steam platen construction.

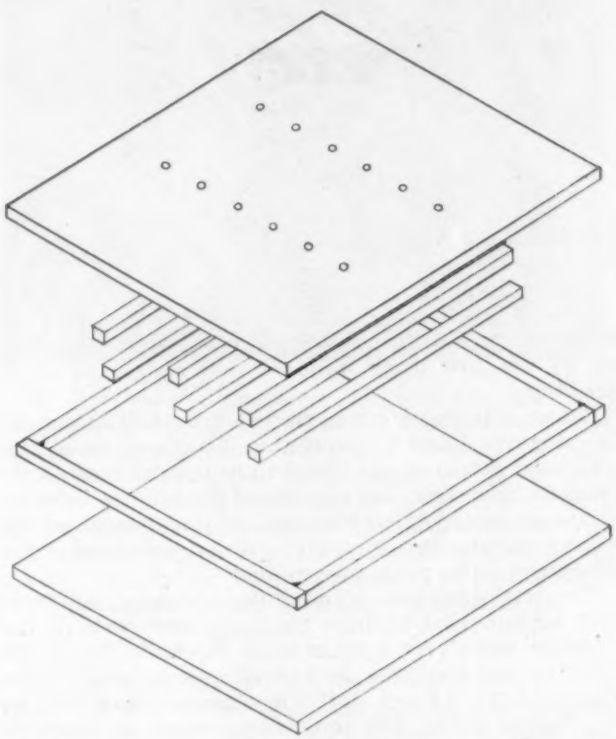


FIG. 3—Stages of assembly of arc welded steam platen.

The conventional method of manufacturing steam platens (see Figure 1) has been to drill a series of parallel holes through a steel plate of a suitable size, drill a hole near each end of the plate at a right angle to the parallel holes, plug all holes at the edge of the plate, and plug alternate spaces between parallel holes; thus creating a labyrinth to cause the circulation of steam.

The extreme depth of these holes, which on some platens is as much as 48 inches, makes this method of manufacture very difficult and costly. A study was made to determine if a more economical method of manufacture could be found.

Casting was considered and abandoned due to a number of reasons; namely, prompt delivery could not be obtained on steel castings, the tensile strength and homogenous structure required was difficult to attain in a casting, and the casting of small parallel holes of the depth required in connection with the necessary patterns and core boxes would make a casting which would equal or exceed a drilled platen in cost.

Arc welding was next considered and was found to be most practical as to economy of manufacture and for the necessary strength and serviceability. The method

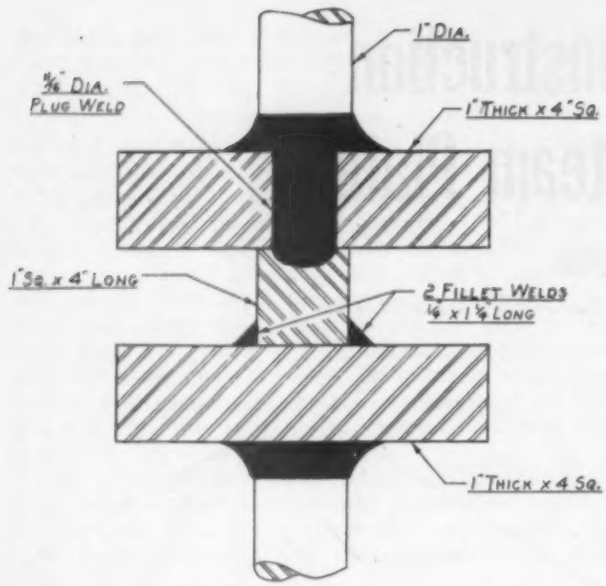


FIG. 4—Schematic drawing of the test weld specimen.

of construction for arc welding decided upon (see Figure 2) was that using standard steel plates and stock size bars.

Before manufacture was started, test weld specimens (see Figures 4 and 5) simulating the critical cross sections were prepared and found to have more than ample strength. Since economy was one of the prime requisites, the design incorporated fillet type welding throughout the entire structure, thus simplifying the preparation of the component parts prior to welding.

The test specimens showed the shrinkage of these fillet welds tended to draw the component parts of the structure into a very compact mass. Fleetweld No. 5 rod, 3/16" in diameter, was used on all internal welds while Fleetweld No. 11 rod, 3/16" in diameter, was used on all external welds. The progressive stages of assembly are shown in Figure 3. An actual view of the finished platen, with top plate removed, is shown in Figure 6.

The method of preparing the stock is as follows:

(1) Flame cut a bottom plate to the required size and surface grind on one side.

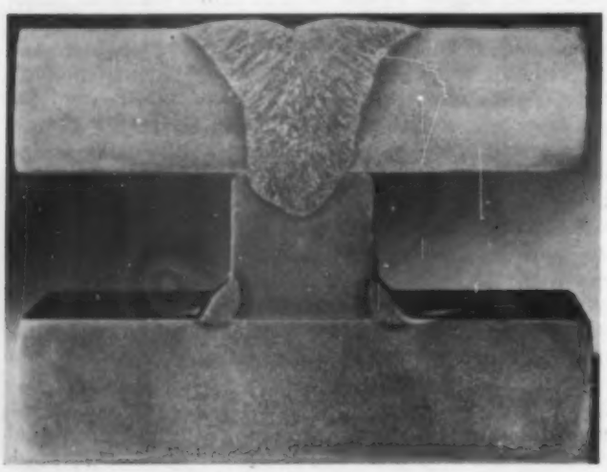


FIG. 5—Actual view of the finished test weld specimen.

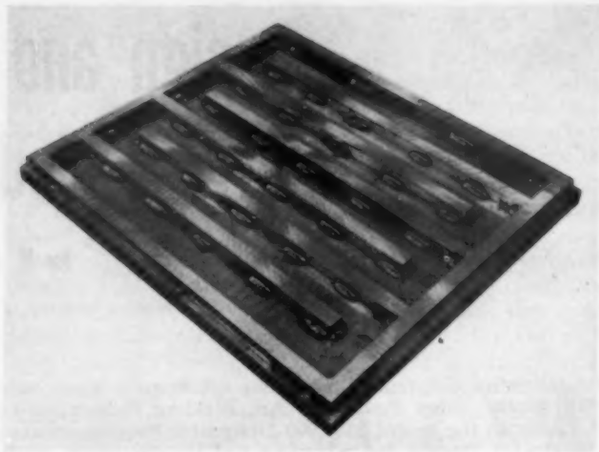


FIG. 6—Actual view of the welded platen with the top plate removed.

(2) Prepare a center frame ½" smaller than the bottom plate, fabricated of stock size bars, fillet welded on the inside corners, and surface ground on both sides to the required thickness.

(3) Prepare internal ribs of stock size bars, surface ground on both sides to the same thickness as the center frame.

(4) Prepare a top plate the same as the bottom plate with the exception that it has a series of drilled holes located to meet the internal ribs.

At the final assembly, the center frame is placed in position on the bottom plate and tacked lightly to prevent shifting. Next, the internal ribs are placed in position and fillet welded to the bottom plate and center frame. These internal ribs are spaced so as to create a rectangular shaped labyrinth which causes the circulation of steam. The rectangular-shaped steam chamber also proved to be more efficient in the radiation of heat than drilled holes.

The top plate is next placed in position, ground side in contact with the center frame, and welded to the internal ribs through the drilled holes in the top plate. The final welding operation is to make the fillet welds around the outside of the platen, thus sealing the steam chamber.

To complete the platen, both outside surfaces are then ground to the required thickness and pipe connection holes are drilled and tapped.

The first platen manufactured was subjected to an internal hydrostatic pressure of 1250 p.s.i. without distortion. As the operating pressure was 125 p.s.i., this provided a factor of safety of ten which was considered ample. Pressure was then increased until rupture occurred, which was at 2000 p.s.i.

Considerable Savings Involved

An analysis of a 2⅝" x 26" x 30" Platen showed the following advantages: (a) Decrease in Weight, 12.8%; (b) Decrease in Cost, 45.5%; (c) More Uniform Radiation.

On larger platens, a greater percentage of savings is possible. On a 3" x 45" x 54" platen the savings will approximate 60%.

A considerable intangible saving was realized through the elimination of the original cost and maintenance of the special drills for exceptionally deep holes. Drill breakage is quite frequent on this type work.

Solution to the Problem of Uniform Abrasion in the Testing of Textiles

RESISTANCE to abrasion is an important factor in the serviceability of many organic and inorganic products, such as textiles, rubber, plastics, leather, linoleum, ceramics, mastic tiles, concrete, stone, wood, and metal. The National Bureau of Standards is at present engaged in research on the measurement of resistance to abrasion as a part of the broad program on abrasion conducted by the Office of the Quartermaster General.

One of the major problems in this work has been the design and development of an abrasion machine that will abrade a plane area of a specimen uniformly over the entire surface and from every direction in its plane. A complete mathematical solution to this problem has been worked out by Herbert F. Schiefer, and a machine based upon the solution has been constructed at the Bureau.

In an attempt to approximate the conditions that produce uniform abrasion, numerous abrasion machines have been developed, several with highly complicated mechanisms. However, in most cases the relative motion between the specimen and abradant is not the same for the whole area of the specimen to be abraded, and in no case is it the same from every direction in the plane of the abraded surface.

In the mathematical solution that was obtained, the abrasion at any instant is constant in magnitude and direction over the whole abraded area. From instant to instant the amount of abrasion remains constant, but the direction changes continuously through 360° in each cycle. This general solution requires that plane areas af the abradant and of the specimen, which are in contact under pressure, rotate in the same direction and with the same angular velocity. The specimen must at all times be completely in contact with the abradant, and the specimen and abradant must not be coaxial. The specimen may revolve about the center of the abradant with any angular velocity in the same direction as its rotation or in the opposite direction.

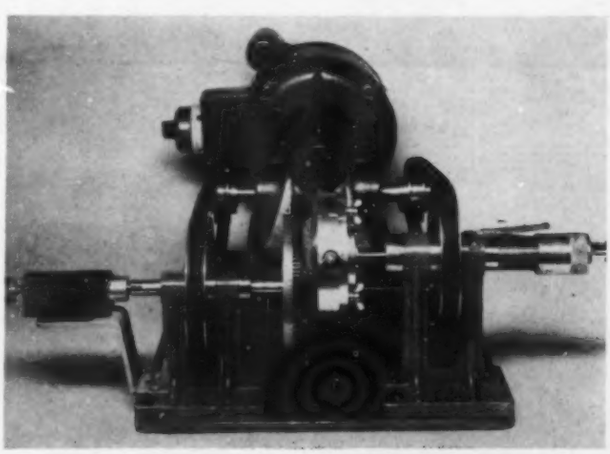


FIG. 1—Abrasion machine for testing textiles designed and constructed at the National Bureau of Standards. A plane abradant, consisting of parallel strips of clock spring, and a plane area of a fabric are in contact under a known pressure. The abradant and specimen rotate in the same direction and with the same angular velocity, but they must not be coaxial. Uniform abrasion is thus produced over the whole area of the specimen from every direction in its plane.

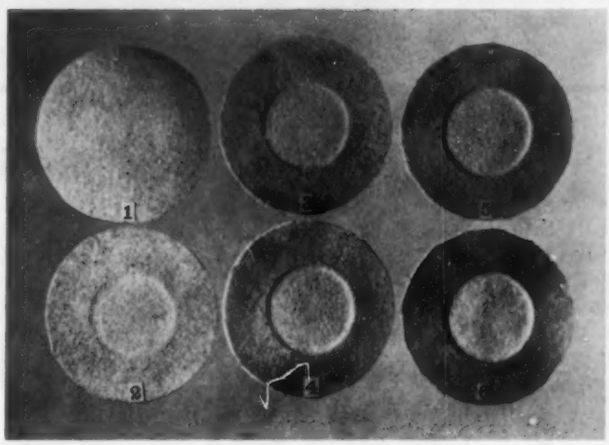


FIG. 2—Uniform abrasion produced by the new abrasion machine developed at the National Bureau of Standards is illustrated in 6 felt specimens. Specimen 1 is the original felt. The other specimens were abraded in increasing amounts ranging from 5,000 to 25,000 rotations in increments of 5,000 rotations. For felts the decrease in thickness with the number of rotations appears to be satisfactory for computing a quantitative index of the amount of abrasion.

The simplest solution from mechanical considerations is the special solution in which both abradant and specimen rotate in the same direction and with the same angular velocity while the specimen does not revolve. A machine based upon this special solution (Figure 1) has been constructed and found to operate satisfactorily for a wide variety of textile products.

A new feature of this machine is the abradant. It consists of a disk 4½ inches in diameter, in one face of which are inserted a series of parallel strips of clock spring, 0.025 inch thick and spaced ⅛ inch apart. The edges of these springs, ground and lapped to a plane surface, constitute the abradant for textile materials. Although tests indicate that the abrasive effect of this device remains constant, the abradant is, obviously, not uniform over its entire area. Any effect on the result of a test due to non-uniformity in the abradant is eliminated by rotating the abradant once more than the specimen in every 240 rotations.

Abrasion machines based upon the mathematical solution which has been derived have many advantages. The

resistance to abrasion of many products, such as textiles, varies greatly with the direction of the abrasion because of structural differences due to the type of weave and the kinds of yarns and fibers used in the warp and in the filling. Since such machines can abrade plane areas of a specimen equally from every direction, the effect of fabric construction or "form factor" on the resistance to abrasion can be evaluated directly. Systematic studies of the effects of weave design and yarn construction on the resistance to abrasion should eventually lead to the development of "balanced fabrics," that is, fabrics which are equally resistant from every direction and therefore more durable.

It will also be possible for the first time to abrade a number of specimens simultaneously in such a way that each specimen receives exactly the same amount and kind of abrasion (Figure 2), since the same area of the abradant acts in the same way on each specimen in each cycle or rotation. This will permit the investigator to test several experimental specimens simultaneously with a standard specimen and obtain a true comparative value at any time during the tests, even though the abradant is not uniform and does not remain constant during the test. Machines based upon the mathematical solution may thus have many applications in research and in dustry for a wide variety of materials.

Polyethylene Used as Sheathing for Extra High Voltage Cables

FOR the first time in history extra high voltage cables are now being sheathed with polyethylene instead of the conventional lead, according to a report in the January, 1948, issue of Bakelite Review, house organ of the Bakelite Corporation. Already extensive installations are under construction in New York, Florida and Wisconsin—two at 138,000 volts. The total length of these installations is about 21 miles, hence 63 miles of single core cable will be used. These installations, called Compression Cable Systems, consist of 3 oil-paper insulated conductors, each of oval cross section and protected overall by a metal reinforced polyethylene sheath, pulled into a steel pipe line laid beneath the streets. The pipe is filled with gas or oil at 200 lb. pressure.

In this new application polyethylene is not just a substitute for lead. It makes possible the adoption of a highly successful system meeting all requirements of utility engineers. The properties of polyethylene which have made this great advance possible are many. It is light in weight, is impermeable to moisture, and it is chemically inert in contact with delicate high voltage insulation. It is a homogeneous material containing no volatile plasticizers, it is inherently flexible and resists fatigue on the flexing to which a cable sheath is subjected.

Basically, high voltage cable installation requires the conductor to be surrounded by a dielectric or non-conductor, capable of resisting normal or average heat, plus the abnormality of extreme heat due to emergency loads. The most common dielectric is a chemically inert oil. To maintain the oil in uniform proximity with the conductor, it is applied as an impregnation of a cellulose paper wrapped mechanically tight to the conductor. The final basic problem is to enclose the conductor and its dielectric in a casing which protects it from moisture and contamination, and maintains its mechanical and electrical integrity. The polyethylene sheath fulfills these requirements, making the cable a factory-sealed unit throughout shipment, installation, and service life.

The high-compression cable, as designed for the power companies by the Habirshaw Division of Phelps Dodge Copper Products Corporation, uses these fundamentals with features that promote greater dependability and simpler installation. For example, in one cable system that has been used in this country, the cable core, that is, the conductor and its dielectric, is protected initially by a continuous lead sheath, which is then stripped from the cable as it is fed into the pipe protecting it against moisture and loss of oil only until the actual installation. The new cable, using the polyethylene sheath, does not have its sheath stripped away, but it serves to protect the cable and its dielectric through all its operating life. The sheathed cable installed in a steel pipe, is surrounded by gas or oil at 200 lb. per square inch pressure.

The high pressure which determines the cable's designation as a compression type, serves to squeeze the layers of paper in the dielectric area together, promoting its efficiency by eliminating free gas pockets which cause ionization. The polyethylene sheath distributes the pressure throughout the dielectric, and allows the cable to adjust itself to the expansion and contractions of the oil.

Copper skid wires are attached to the outer periphery of the cable to reduce pulling friction and it was shown that two to three thousand feet of cable could be pulled through the conduits. This resulted in fewer splices and fewer man-hole constructions. This system allowed the use of a much higher viscosity oil as the insulation, having maximum chemical and electrical stability, and a low viscosity oil as the pressure medium.

The cable is said to be capable of carrying four times its normal working voltages and to fully satisfy the need for a cable whose life should be thirty to fifty years at a minimum.

Letter to the Editor

Dear Sir:

In your November, 1947, issue, page 193, your contributor, Mr. J. C. Searer on the subject of Phenolic Resins in Natural and Synthetic Rubber makes a statement that the use of phenolics is relatively new, and I would point out that I employed phenolformaldehyde resinoid in oil and petrol (gasoline) resisting rubbers prior to 1918, and that airplane petrol hose under the trade name of "Solcenti" was used during World War I, and patent protection was obtained which has since lapsed.

The plasticizing, improved and petrol resisting properties as a result of conversion into the infusible, insoluble state during vulcanization, as well as the enhanced properties of the mix, were fully appreciated then in natural rubber, and I should appreciate it if you wou'd give publicity to this fact.

ALAN SPEEDY

Binney & Smith & Ashby, Ltd.
116 Cannon Street
London, E.C. 4, England
December 24, 1947.

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Editorials . . . . . .

Shafer Bill

AFTER many months of intensive investigation proposed long range rubber legislation was introduced in Congress by Representative Paul W. Shafer (Rep., Mich.) on January 19. It was subsequently referred to the House Armed Services subcommittee, headed by Mr. Shafer, slightly revised and amended, and finally recommended to the full committee on February 6. The amended measure (HR-5007) has already been taken up by the full committee and passage in the House is expected promptly. Brief hearings will probably be held by the Senate Banking and Currency subcommittee, headed by Senator John W. Bricker (Rep., Ohio), before the bill is put before the upper chamber. Passage of the bill before April 1 is essential.

Because of the numerous complexities which faced the legislators the bill as now written represents a number of compromises, and various segments of the industry will find flaws in it. However, it was primarily designed to protect the national welfare and is an adequate framework on which to build a long range national rubber policy. It delves into the many problems presented by synthetic rubber and is definite in respect to the present and future of that material.

The specific terms of the Shafer Bill are reported in some detail elsewhere in this issue. The more important phases of the bill may be summed up as follows:

(1) It requires the annual use by the domestic rubber manufacturing industry of at least 225,000 long tons of synthetic rubber, of which 200,000 tons must be GR-S and 25,000 tons special purpose synthetic (butyl, neoprene, etc.). Production facilities for 600,000 tons of GR-S and 75,000 tons of special purpose synthetic must be maintained continuously either in active operation or in stand-by condition.

(2) It gives the President authority to negotiate modification of the wartime patent pooling agreement to the end that private companies can secure patents for their own benefit on future synthetic rubber developments. However, all new patents must be available for the government on a reasonable basis.

(3) It expresses Congressional opposition to the early disposal of synthetic rubber production facilities but makes provision for such disposal subject to the specific approval of Congress and only after Administration affidavits are secured assuring that any disposal would facilitate and advance national security.

(4) It authorizes the President to designate a single agency of his own choosing to exercise allocation, specification and inventory controls of both natural and synthetic rubber and to sell the government-produced synthetic rubber.

Originally, the Shafer Bill omitted any direct reference to the patent pooling arrangement, with the intention of allowing this highly controversial subject to be thrashed out on the House floor. Since the question of disposal of synthetic rubber facilities ties in so closely with the patent problem it is fortunate that the bill was amended to cover this phase. There is little doubt that any modification of the cross licensing system which now exists will be vigorously opposed by some segments of the industry at any public hearings on the bill and probably on the floors of both the House and Senate, but modification is warranted in the interests of research and development and will undoubtedly be approved.

Some objection to the bill may be raised on the ground that it fails to set a termination date for its provisions. Because of this omission, John L. Collyer, president of the B. F. Goodrich Co., claims that it "applies permanent socialized control to what should be a free, competitive industry." It is true that the bill contains some provisions which the industry would not endorse on any long term or permanent basis, but Mr. Shafer, sponsor of the bill, argues that as now written it calls for periodic review by Congress of the over-all situation and can be amended from time to time to meet existing situations. From the industry standpoint, a definite termination date of about two years would be preferable.

It is obvious that the rubber industry will have to remain subject to continued government control for some time to come, with such control in the hands of any agency the President designates. The chances are fairly strong that mandatory consumption of synthetic rubber will be concentrated in the tire and tube field. If such regulation is effected, it would greatly simplify the administration problem. The amount of synthetic rubber consumed by the non-regulated branches of the industry would be a good barometer for the eventual natural versus synthetic competition.

CURRENT NEWS OF THE MONTH

NEW LEGISLATION INTRODUCED TO CONGRESS STRESSES MANDATORY USAGE OF SYNTHETIC

LEGISLATION designed to guarantee the maintenance of the government's synthetic rubber program was introduced in Congress on January 19 by Rep. Paul W. Shafer (R., Mich.). Although Rep. Shafer is chairman of a House Armed Services subcommittee which has been studying the problem in order to determine a national rubber policy, it was emphasized that the bill was proposed by Rep. Shafer without prior consultation with other members of the subcommittee. Upon presentation on the floor of the House, the bill was referred back to the subcommittee for hearings.

As presented, the bill requires the American rubber industry to use at least 200,000 long tons of GR-S and 25,000 tons of special purpose synthetic rubber a year. Mr. Shafer's bill grants the President broad discretionary authority to assure production of at least these quantities of synthetic rubber and to require American rubber manufacturers to use at least these tonnages through allocation and inventory controls.

Mandatory Use of Synthetic

Mr. Shafer maintained that the bill which he introduced is intended as permanent legislation. Mandatory use of stated tonnages of synthetic rubber, however, is a new approach. Current legislation expiring April 1 sought this aim through limiting the percentage of natural rubber in manufactured products. Mr. Shafer expressed the opinion that in two years time mandatory use might be discarded.

The bill would put an end to patent pooling arrangements, but Mr. Shafer predicted that an effort will be made to restore these on the House floor. Patent pooling was eliminated as a gesture to small scale rubber manufacturers, he said, but some of the "big five" are expected to fight for restoration. The Representative said that both industry and government will be given an opportunity to present their views on the bill in public hearings before his subcommittee.

Rep. Shafer's bill makes the following provisions:

(1) Sets up tonnages of 600,000 long tons of GR-S and 75,000 tons of special purpose synthetic rubber as the rated production capacity to be maintained continuously either in active operation or standby. These include facilities for making butadiene, styrene and other rubber materials.

(2) Requires minimum production of 200,000 long tons of GR-S and 25,000 tons of special rubber such as butyl and neoprene. The President is required to see that these tonnages are used, but may require through an agency of his own choosing that greater quantities be used.

(3) Gives the President discretionary authority to determine which plants should be operated and which put in standby, and require that he maintain at least one alcohol-butadiene plant in either standby or operation.

Single Administrative Agency

(4) Packs into a single agency to be designated by the President the job of administering all aspects of the rubber program, including sale of Government produced synthetics, disposal planning, and actual disposal of rubber facilities. However, that agency, presumably the Commerce Department, must submit all disposal plans to Congress where they must be approved by concurrent legislation of both houses. Plans submitted must bear an affidavit by the National Security Resources Board approving disposal on security grounds and must also specify that a certain amount of synthetic rubber be made at the plant and sold on a fair and non-discriminatory basis to all persons.

(5) Provides for Congressional appropriations for Government research and development and grants the President authority to designate the agencies to conduct this work.

Other features of the bill permit the president to impose import restrictions to bar all natural rubber products, exempt from use specifications products made for export only, permit lease of standby facilities provided they can revert to their original operations in 60 days, and withdraw from surplus any plants not yet sold.

Opposition Resolution Offered

In almost direct opposition to the Shafer Bill (HR 5007) was a joint resolution introduced to the House on January 29 by Rep. Lyndon B. Johnson (Dem., Texas), minority member of the House Armed Services Subcommittee.

After setting forth a suggested national rubber policy the Johnson resolution stated that "the powers, functions, duties and authority of the United States to manufacture and sell synthetic rubber shall continue in force until the effective date of permanent legislation . . . but in no event beyond March 31, 1950."

The sum and substance of the Johnson resolution was the prohibition of the disposal of any synthetic rubber plant and facilities until the enactment of permanent legislation unless such disposal "shall have been first approved by a concurrent resolution of Congress."

Mr. Johnson's resolution, like the Shafer Bill, avoided reference to the controversial issue of terminating patent pooling and cross licensing agreements among private operator's of the government plants. In contrast to the Shafer Bill, the Johnson resolution set forth no minimum production of synthetic rubber.

Subcommittee Agrees on Bill

Meeting in closed session on February 2, the House Armed Services Subcommittee accepted the Shafer Bill, but eliminated that section of the bill under which the Administration would be given the authority to dispose of the synthetic rubber facilities. Instead, it adopted an amendment based on the Johnson resolution to the effect that all sale or lease proposals must be approved by concurrent resolution of Congress and furthermore that such proposals can be submitted by the National Security Resources Board only if they advance national security.

The subcommittee also plans to recommend an amendment pertaining to the patent pool issue. In this connection it was revealed that such an amendment has already been drawn up by the subcomittee the terms of which would modify the present agreement to the extent of permitting private industry to retain control of basic developments. The proposed amendment has been submitted to John R. Steelman, assistant to the president, and to the Attorney General, and if found satisfactory will be included in the Shafer Bill.

The House subcommittee, despite previous indications, is not planning to hold any further public hearings. If the Shafer Bill clears through the House, it is probable that public hearings will be held by a subcommittee of the Senate Banking Committee before it reaches the floor of the Senate. The Senate subcommittee on rubber is headed by Senator John W. Bricker (Rep., Ohio).

Although the original Shafer Bill referred to GR-S as "American Made Rubber," as a result of a report reflecting the views of 13 interested government agencies the revised bill will use the term "chemically made rubber."

LATER: The House Armed Services Subcommittee reported the Shafer Bill to the full committee on February 6. It includes a modification of the patent pooling and cross licensing arrangement.

APPLICATIONS OF DESMODUR R COVERED IN SPECIAL REPORTS

A number of special reports dealing with the application of Desmodur R, the triisocyanate derived from tri-(p-aminophenyl) methane, which was widely used in Germany as a bonding agent, have been made available by the Office of Technical Services, Department of Commerce.

The properties of Desmodur R, methods of applying it, and two tests for adhesion are discussed in the report entitled "Study of New Adhesives Produced by I. G. Farbenindustrie, A.G., Leverkusen" (PB-1336, mimeographed, 13 pages, 50c).

Three ways of applying the adhesive are described. The most commonly used method is to add Desmodur R to a rubber solution which is then used as an adhesive. It also may be used to impregnate the fabric before calendering, or 2 to 3 per cent may be added to the rubber before calendering. Detailed instructions about the use of each process are appended to the report.

Commercial Desmodur R solutions may be further diluted with a wide variety of organic solvents but storage of these dilute solutions is not advisable, according to the report. Particularly good diluents are found in methylene chloride or ethyl acetate, especially anhydrous alcohol-free ethyl acetate. Benzol and petroleum hydro-carbons may also be used. A more concentrated solution of Desmodur R (50 per cent in ethyl acetate) also has been put on the market in Germany.

Two methods of testing adhesion, a static and a dynamic test, were developed by I. G. Farbenindustrie. In the static test, the cords are put into a hot press and cured into a rubber slab. The cured sample is then tested in a vertical tester by measuring the force required to pull the cord out of the rubber slab. The test is similar to the "H" test used by some American tire companies. The dynamic test had not yet been standardized and was still in process of development at the time the investigation was made. The operation of the test is described in the report, however.

German production practices in using Desmodur R as a bonderizing agent between tire cord fabrics and their rubber coatings are covered in "Synthetic Rubber Desmodur R" (PB-27521, mimeographed, 9 pages, 25c).

German cotton, rayon and perlon (similar to nylon) single cord cables were processed in the laboratories of I. G. Farben using Desmodur R both as a dip and as a dough. Factory procedures were simulated as closely as possible. The treated cords were cut in lengths of 50 cm. and cured in a rubber sandwich 6 mm. thick in such a way that the center 2 mm. of each cord length was vulcanized in tire carcass compound. The rubber sandwich test strips were subjected to both the dynamic and static tests. Two photographs show the dynamic cord adhesion tester with the rubber sandwich strips in place. The results of the tests are described.

The doughing and dipping processes for applying Desmodur R are both discussed and the I. G. Farben formula for dough for use on a spreading machine is given. The dough can be used on standard spreading machines.

The advantages of Desmodur R over other adhesives is covered in "Production and Performance of German Synthetic Tires and Other Transportation Items" (PB-28835, mimeographed, 86 pages, 50c), although the report is primarily a discussion of German synthetic tire production.

Certain experimental work at the Leverkusen Central Laboratories concerning attempts to improve conventional dipping and doughing practices ,and elimination of the impregnating process by applying a Desmodur R-containing dough directly to the dried rayon is reported.

The report points out that Desmodur R solutions tend to gel and produce scorch in compounds. Trouble also developed in removing dried out dough containing Desmodur R from drying drums and other parts of the doughing machine. These difficulties were solved by applying a second coat of dough from which Desmodur R was omitted.

Another report, "The Harburger Gummiwaren-Fabrik Phoenix A. G." (PB-192, mimeographed, 117 pages, 75c), is concerned mainly with a discussion of production processes employed by the Phoenix firm in making tires and tubes, conveyor belts, hose, shoes, surgicals, and other rubber items, but includes a discussion of the use of Desmodur R at this plant. The Desmodur R dip solution for rayon and perlon cord fabric is described and results of adhesion tests are given. The dip solution is used also to improve adhesion on fabric for conveyor belts, hose, and bicycle tires. Plans had been made for its use in footwear.

In addition to these reports, four others have been made available dealing with the manufacture and development of the Desmodurs. These are: *Manufacturing Process for Desmodur R* (PB-19858, mimeographed, 8 pages, 25c); *Manufacture of Desmodurs and Desmophens* (PB-60908, mimeographed, 4 pages, 25c); *Interview with Prof. Otto Bayer* (PB-45246, mimeographed, 8 pages, 25c); and *I. G. Farbenindustrie, Elberfeld and Leverkusen* (PB-185, mimeographed, 11 pages, 25c).

Orders for the reports should be addressed to the Office of Technical Services, Department of Commerce, Washington 25, D. C., and should be accompanied by check or money order, payable to the Treasurer of the United States.

Changes at General Cable

A few personnel changes were recently made by the General Cable Corporation. William Vincent, formerly assistant director of manufacturing, with headquarters at the New York office, has been made plant manager at Rome, N. Y., succeeding L. F. Buckman, who has retired from the company. Carl Humphreys has been named assistant director of research at the Bayonne, N. J., laboratories, while Ralph Tefft, also stationed at Bayonne, is now chief chemist on rubber and plastics. J. F. Manion has retired from the company.

Goodrich Chemical Building Plant

The B. F. Goodrich Chemical Co. is planning the early construction of a new $3,000,000 chemical plant in Avon Lake, near Cleveland, Ohio, close to the site of its present pilot plant in that area. Production at the new plant will supplement the company's output of synthetic rubber, polyvinyl resins, and organic chemical products. Construction is scheduled to start in spring or early summer.

ATHENS PLANT DEVOTED EXCLUSIVELY TO PRODUCTION OF TIRE MOLDS

Completion of what is believed to be the first plant devoted exclusively to the manufacture of tire molds was recently announced by Boyd E. Bridgwater, vice-president of the Bridgwater Machine Co., Akron. The new plant, known as the Athens Machine Division of the Bridgwater Machine Co., is located at Athens, Ohio. Charles R. Dailey is plant manager. The plant, which is located on 4½ acres of land, currently employs about 80 workers. According to Mr. Bridgwater, the fact that the new plant will be devoted exclusively to the manufacture of tire molds should result in many advantages to the industry, since "a balanced shop with the right number of tools of the right nature uninterrupted by machining requirements of other products, can produce faster and at lower cost."

PROMOTIONS AND RETIREMENTS ANNOUNCED BY THE BUREAU OF STANDARDS

Two promotions and two retirements, all of direct interest to the rubber manufacturing field, were recently announced by the National Bureau of Standards, Washington, D. C.

Dr. Gordon M. Kline, Chief of the Organic Plastics Section, has been appointed Assistant Chief of the Division of Organic and Fibrous Materials, succeeding Philip L. Wormeley, who has retired after 37 years of service with the Bureau and 44 with the government.

Dr. Robert D. Stiehler has been appointed Chief of the Testing and Specifications Section of the Division of Organic and Fibrous Materials. William L. Holt, associated with the Bureau for 26 years as a rubber technologist, has retired for reasons of poor health.

Gordon M. Kline: Nationally known for his research in such fields as the oxidation of sugar, airplane dopes, polymerization of olefins, and organic plastics, Dr. Kline has been technical editor of *Modern Plastics* and the editorial director of *Modern Plastics Encyclopedia* for almost twelve years. He was one of the first American scientists to investigate the German plastics and chemical industries. These investigations were initiated well before the close of the war in Europe.

Dr. Kline received his B. A. from Colgate University in 1925, his master's degree from George Washington University in 1926, and his doctorate from the University of Maryland in 1934. He was a research chemist with the New York State Department of Health from 1926 to 1928 and the following year went to Picatinny Arsenal. In 1929, Dr. Kline joined the staff of the National Bureau of Standards, becoming Chief of the Organic Plastics Section in 1935. He will continue as chief of that section, in addition to assuming added responsibilities as assistant chief of the division.

Dr. Kline is a member of the Aircraft Structural Materials Committee of the National Advisory Committee for Aeronautics and is chairman of the Federal Specifications Technical Committee on Plastics and Vice-chairman of Committee D-20 on Plastics of the American Society for Testing Materials. He is also a member of the American Institute of Chemists, the American Chemical Society, the American Society of Mechanical Engineers, the Chemists Club of New York, the Society of the Plastics Industry, and the Washington Academy of Sciences.

Philip L. Wormeley: Best known for his research on tires, Mr. Wormeley has contributed extensively to the fields of leather, rubber, and the development of Federal Specifications. In collaboration with W. L. Holt, he did pioneer work on the endurance and dynamometer tests for tires and investigated power losses in tires and the effects of these power losses on fuel consumption. The paper "Wearing Qualities of Tire Treads as Influenced by Reclaimed Rubber," by Wormeley and Holt, provoked wide controversy when it was published, but the findings were subsequently fully confirmed by investigations in industry.

Mr. Wormeley is the author of numerous technical papers. His Circular 38 on the "Testing of Rubber Goods" has been for many years a standard reference work in the rubber industry. Born in Richmond, Virginia, in 1878, Mr. Wormeley attended the University of Virginia, graduating in 1901 with degrees in mechanical and electrical engineering. In college he was distinguished for brilliant work in mathematics.

Before coming to Washington, he worked with the New Amsterdam Gas Company in New York and was professor of engineering, applied mathematics, and mechanical drawing at the College of Charleston, South Carolina. From 1904 to 1910, he was assistant engineer and engineer of tests in the Bureau of Chemistry of the Department of Agriculture.

From 1910 to 1947 Mr. Wormeley was with the Bureau of Standards. While at the Bureau, he was first a technologist, then Chief of the Rubber and Leather Section, Chief of the Rubber Section, Chief of Testing and Specifications Section, and Assistant Chief of the Division of Organic and Fibrous Materials. He served as Chairman of both the Rubber Products Committee and the Gaskets and Packing Committee since their organization in 1921.

Robert D. Stiehler: Well known for his research on rubber, Dr. Stiehler was instrumental in developing methods of quality control for synthetic rubber production in government plants during the war. Formerly with the Office of Rubber Reserve, he has been with the National Bureau of Standards since 1946.

Dr. Stiehler attended Rensselaer Polytechnic Institute and received his Ph.D. from Johns Hopkins University in 1933. The following year he was a National Research Council fellow at the California Institute of Technology, returning to Johns Hopkins as a research fellow and assistant in opthalmology, where he remained until 1938.

Dr. Stiehler joined the B. F. Goodrich Company as senior research chemist in 1939 to do research on the theory of vulcanization. He left in 1942 to become Technical Director of the Climatic Research Laboratory with the Quartermaster Corps in Lawrence, Massachusetts. In 1943, he came to Washington, D. C., where he was placed in charge of the Product Testing and Quality Control Branch of the Office of Rubber Reserve.

William L. Holt: Mr. Holt is a graduate of the University of Michigan with a degree of Bachelor of Mechanical Engineering which he obtained in 1913. After graduation he worked as a Methods Engineer for the Western Electric Company and as an Experimental Engineer for the B. F. Goodrich Company. While with these two companies he worked with molded goods and also with the building and testing of pneumatic tires.

In April of 1921 he came to the National Bureau of Standards as Assistant Mechanical Engineer. His early work at the Bureau was mostly with tires, studying their efficiencies, power losses, wearing qualities, causes of failure, and similar properties. Later, his work broadened into other fields of rubber technology, especially in the field of development of testing machines and apparatus for rubber research. Mr. Holt participated in the design of an abrasion machine, a machine for testing brake lining, an autographic machine for the continuous recording of stress, and, more recently, a strain tester which is an automatic machine for the precise measurement of elongations of rubber strips at constant stresses. These developments and researches have led to more than thirty publications.

Gordon M. Kline

P. L. Wormeley

R. D. Stiehler

Wm. L. Holt

U.R.W. ASKS WAGE BOOST WHICH INCLUDES WELFARE FUND

The policy committee of the United Rubber, Cork, Linoleum & Plastic Workers of America, C.I.O., on February 8, approved a wage program demanding a 30-cent an hour increase. Approximately 10-cents of that amount will be applied to a union welfare fund.

The wage program, covering about 200,000 members of the U.R.W., came at the end of a two-day meeting of the committee at Cleveland, Ohio. The average hourly rate of rubber workers is now approximately $1.32. Rubber workers work a 36-hour week in Akron, Detroit and Los Angeles. In other cities, a 40-hour week applies.

L. S. Buckmaster, union president, said the specific amount of the 30-cent wage increase to be set aside for establishment or improvement of the welfare funds, insurance, hospitalization, sick and accident, and retirement program will be decided by each local union in collective bargaining with employers. This is the first time the U.R.W. has sought funds for these purposes through collective bargaining.

Cost of Living Bonus

The Union policy committee also approved provisions in its wage program for automatic pay increases through a cost of living bonus, with the understanding that such bonuses will not permit reduction in wage rates below those prevailing after settlement is reached on the current 30-cent an hour program.

Bargaining in the union's wage program will be mapped at the union's executive board meetings, and Mr. Buckmaster said negotiations would be on whatever basis that "collective bargaining on wages can be most effectively conducted." This method of bargaining will leave the way open for company wide negotiations in cases where the union has company wide contracts. It will also permit local union bargaining where contracts are on a local plant basis, or it would permit bargaining on a broader or industry basis.

The wage demand was announced as employment in the Akron rubber industry continues downward. Ohio Employment Service figures for rubber industry employment in Akron in January this year show 61,400 salaried and hourly workers employed. In November, 1946, the figure was 69,100.

The U.R.W. is the third major C.I.O. union to make demands for wage increases since the start of 1948. The United Electrical Workers recently announced it would seek "substantial wage increases." The union did not officially state how much of a wage boost it would ask, but said an increase of 32½ cents an hour was needed to offset the rise in living costs since the pay of U.E.W. members was advanced 15 cents an hour last year.

The United Auto Workers demanded the equivalent of 30 cents an hour on January 16. In addition to a 25 cent hourly wage boost, the executive board announced the U.A.W. would ask 5 cents an hour extra for hospitalization, health and medical insurance.

Coming Events

Feb. 20. Detroit Rubber & Plastics Group.

Feb. 20. Southern Ohio Rubber Group, Engineer's Club, Dayton, Ohio.

Mar. 8-20. American Toy Fair, Hotel McAlpin, New York.

Mar. 11. Quebec Rubber Group, Ritz-Carlton Hotel, Montreal.

Mar. 19. Boston Rubber Group, Hotel Somerset, Boston.

Mar. 26. Chicago Rubber Group.

Apr. 8. Quebec Rubber Group, Ritz-Carlton Hotel, Montreal.

Apr. 16. Akron Rubber Group.

Apr. 21-23. Rubber Division, A.C.S., Spring Meeting, Hotel Sherman, Chicago.

May 7. Chicago Rubber Group.

May 13. Quebec Rubber Group, Ritz-Carlton Hotel, Montreal.

May 14. Connecticut Rubber Group.

May 21. Detroit Rubber & Plastics Group, Detroit-Leland Hotel, Detroit, Mich.

June 8. Rubber Division, C.I.C., Windsor Hotel, Mount Royal Hotel, Montreal, Canada.

June 18. Akron Rubber Group, Outing.

June 21-25. A.S.T.M., Annual Meeting, Book-Cadillac Hotel, Detroit.

June 25. Detroit Rubber & Plastics Group, Outing, Forest Lake Country Club, Detroit, Mich.

July 22-23. Rubber Division, A.C.S., Regional Meeting, Hotel Mayfair, Los Angeles, Calif.

Sept. 10. Detroit Rubber & Plastics Group, Detroit-Leland Hotel, Detroit, Mich. (Tentative).

Sept. 24. Boston Rubber Group, Somerset Hotel, Boston.

Nov. 8-10. Rubber Division, A.C.S., Fall Meeting, Book-Cadillac Hotel, Detroit, Mich.

Dec. 10 Detroit Rubber & Plastics Group, Xmas Party, Detroit-Leland Hotel, Detroit, Mich.

Dec. 17. Boston Rubber Group, Somerset Hotel, Boston.

Extra Low Pressure Tires

A talk on "Extra Low Pressure Tires for Passenger Cars" was given by W. E. Shively, manager, tire design, Goodyear Tire & Rubber Co., Akron, at the Annual Meeting of the Society of Automotive Engineers, held in Detroit, Mich., from January 12 to 16. Mr. Shively presented the fundamental and historical considerations which led to the development of these tires, culminating in their introduction to the motor car industry in the last six months of 1947. Specific advantages offered by extra low pressure tires were also covered in the talk.

GENERAL ELECTRIC COMPANY MARKETING SILICONE RUBBER

Immediate marketing of seven standard grades of G-E silicone rubber molding compounds to molders and fabricators has been announced by the Chemical Department, General Electric Co., Pittsfield, Mass. All G-E silicone rubber stocks withstand temperatures ranging from —70° to +520° F., and are reported to have excellent electrical and chemical properties.

Stocks available include both molding and extruding compounds which may be readily processed in customary production equipment. Grades No. 13000 and 13001 are extrusion stocks in white. Grade 13002 is a molding stock in white. Grades 13003, 13005, and 13006, are brown stocks for both extrusion and molding while Grade No. 13004 is white for both extrusion and molding.

Premilling Is Recommended

G.E. recommends that the molding compound be premilled for about 10 minutes on cold rolls prior to molding to insure satisfactory flow and plasticity. The company says molding should be performed at low pressures in standard compression or transfer molds and that the mold design should allow for about two to three per cent dimensional shrinkage on curing. Flash type molds give the most satisfactory results at pressures not exceeding 100 psi, whereas positive or semi-positive molds are usually operated at 400 to 500 psi.

Molding temperature for G-E silicone rubber should be 140° to 160° C. and should be maintained for two to 10 minutes depending on the size and cross-section of the piece. The company recommends that molds should be loaded and unloaded at temperatures below 50° C. to prevent blistering and porosity in the molded piece.

Extruding of silicone rubber stocks is performed in either short or long barrelled production machines but the latter is preferable, G.E. stated. Accurate control of extrusion speed and die temperatures results in better surfaces and closer dimensions for the finished product. Die design should conform closely with the shape of the finished part.

According to General Electric, the silicone rubber compounds, now used principally as gaskets in various types of industrial equipment, have many advantages including heat resistance, non-adherence to metal surfaces, good gasketing action because of low compression set and stability of surface hardness and resilience. The materials do not tend to cold flow nor vulcanize at room temperature. Stocks can be reinforced for additional strength.

Uses for G-E silicone rubber now include gaskets for high speed shafts; diesel, gasoline, jet and gas turbine engines; baking and drying ovens; high temperature lighting equipment; high vacuum systems; capacitor bushings, etc. G-E recently announced a new silicone rubber adhesive which permits bonding of fully-cured rubber to itself as well as to other surfaces.

FURNISH ADDITIONAL DATA ON LOW TEMPERATURE SYNTHETICS

As briefly reported in our previous issue, a new type of GR-S is rapidly reaching the production stage at the government-owned plants operated at Borger, Texas, by the U. S. Rubber Co., and Baton Rouge, La., by the Copolymer Corporation. Some additional information on this new polymer, which will be produced at temperatures between 0° and 40° F. instead of the customary 125° F., has been made available by U. S. Rubber.

According to U. S. Rubber, preliminary tests have indicated that the new polymer is at least the equal of natural rubber in tensile strength and elongation. Its cracking and abrasion resistance is expected to be superior to natural rubber, which recommends its use in tire treads.

U. S. Rubber is equipping a part of the Borger plant to produce GR-S at any temperature down to zero. The remainder of the plant may be so equipped later. No basic change in the plants is required to convert them to production of the new rubber, and the cost is not excessive. It is anticipated that the plants will be able to produce approximately as much rubber at the low temperatures as at present production temperatures.

Kettles to operate at zero are being sheathed in an 8-inch layer of cork, to insulate the contents from outdoor heat. The ingredients of these kettles will include an anti-freeze, to keep the water in the recipe from freezing.

Until recently the production of low temperature rubber was plagued by the time problem. As the temperature was dropped, the chemical change slowed down until, instead of requiring 12 hours, it took 10 days to complete the chemical combination of butadiene and styrene into GR-S at 35 degrees. At zero it would have taken much longer.

Chemists have now overcome this obstacle by discovering four "speed-up" chemicals which together are powerful enough to shorten the time required to the original 12 hours. These chemicals are cumene hydroperoxide, an oxidizing agent; invert sugar, a reducing agent; and sodium pyrophosphate and ferrous sulfate, activating agents.

Airfoam Available for Mattresses

Airfoam, the foamed latex product of the Chemical Products Division of the Goodyear Tire & Rubber Co., has been made available for use in domestic mattresses for the first time since the war. The material will be marketed direct to mattress manufacturers for custom covering and inclusion in their marketing lines. An increased supply of natural rubber and installation of new equipment makes reintroduction of the domestic mattress possible, company officials stated. Goodyear's Airfoam facilities are being greatly expanded by installation of continuous production equipment in a large plant at Akron used for airplane production during the war, which was recently purchased by the company.

Plan Regional Meeting

The Rubber Division, A.C.S., in cooperation with the Los Angeles Rubber Group, will hold a Regional Meeting, the first of its kind, on July 22 and 23 at the Hotel Mayfair in Los Angeles, Calif. Abstracts of all papers intended for presentation at the meeting must be in the hands of the Division's secretary, Charles R. Haynes, c/o Binney & Smith Co., 41 East 42nd St., New York 17, N. Y., no later than May 25, 1948. D. C. Maddy, of the Harwick Standard Chemical Co., 1248 Wholesale St., Los Angeles 21, Calif., is acting as chairman of the Local Arrangements Committee.

Thiokol PR-1 Rubber

The Thiokol Corporation, Trenton 7, N. J., has announced that it can now supply commerical quantities of Thiokol PR-1, its improved oil-resistant rubber which possesses excellent resistance to solvents, greases, oils and motor fuels. Thiokol PR-1 does not require the use of plasticizers to impart low temperature resistance, and accordingly cured stocks are reported to show zero to very low shrinkage in the low swell gasoline and motor oils. The aromatic fuels swell it only slightly. These stocks show good dimensional stability whether used in aromatic fuels, alkylated fuel or alternately in both. The stocks mold easily and show good resistance to compression set after vulcanization. Some plastic deformation is exhibited at temperatures of 150° F. and more, but in applications where compression set is not a factor the stock can be used at much higher temperatures. According to the company, Thiokol PR-1 compounds also display good aging characteristics and good resistance to sunlight and ozone.

Fuller Retires from Stamford

R. H. B. Fuller, who joined the Stamford Rubber Supply Co., Stamford, Conn., as sales manager in 1912, has retired from that organization after some thirty-five years of continuous service. Widely known in the rubber and allied fields, Mr. Fuller is 65 years of age. He plans on taking a complete rest, with stamp collecting as his hobby and then perhaps some travel.

Astlett Reopens Akron Office

H. A. Astlett & Co., crude rubber importers and dealers of New York City, has announced the re-opening of its Akron office under the management of the recently-organized firm of Moss-Mayfield, Inc. The office is located at 309 Second National Building, Akron 8, Ohio. The telephone number is BLackstone 9103.

AUTOMOTIVE TIRE PRODUCTION TO BREAK PREVIOUS RECORDS

It is evident that production and shipments of tires in 1947 will break all records, according to the latest report issued by the Rubber Manufacturers Association. Figures for the first eleven months showed that the industry had produced 71,168,058 passenger casings and 16,330,552 truck and bus casings, as against 60,371,664 and 14,415,357, respectively, for the same period of 1946. Shipments of passenger tires for the first eleven months of 1947 were 68,780,518 units, compared with 59,823,400 in a similar period of 1946.

Shipments of passenger casings in November were 6,413,354, down 8.56% from October when 7,013,941 units were shipped. Truck and bus casings shipped in November totaled 1,501,991 units, down 7.55% from October when 1,624,609 casings were shipped. The total shipments of truck and bus casings for the first eleven months of 1947 amounted to 15,831,111 as against 14,351,558 in the same period last year.

Production of passenger casings totaled 6,382,557 units in November, a drop of 13.34% from October when 7,364,743 were produced. Truck and bus casings produced in November amounted to 1,333,479 units, a drop of 12.51% from October when 1,524,082 units were produced. Manufacturers' inventories of passenger casings at November 30 were down 2.8% to 3,990,905 units, inventory for October being set at 4,108,786 units. Inventory of truck and bus casings at the end of November was 1,265,373 units, a drop of 9.91%.

In the consumption of rubber, the first eleven months of 1947 virtually equaled the total annual consumption for the best previous year in the history of the industry. In 1946, the industry used an all-time record 1,039,296 long tons of new rubber. On the basis of eleven months' performance, 1947 consumption appears to go over 1,110,000 tons.

In the first eleven months of 1947, U. S. manufacturers consumed 506,315 tons of crude rubber and 516,402 tons of synthetic rubber. In addition, the industry used 263,100 tons of reclaimed rubber through November 30, the RMA reported.

New Synthetic Rubber Stock

The Felt Products Manufacturing Co., Chicago, Ill., has developed a new synthetic rubber compound, and claims for it a set of specifications as yet unmatched by any other commercial stock. Named "Fel-Pro 131," the cost of the product will fall into the lower-price level of other synthetic stocks due to special manufacturing techniques, the company said. Reports of laboratory tests conducted by the company and verified by an independent testing laboratory are summarized as follows: 1,800 lbs. p.s.i. tensile strength; 400% plus ultimate elongation; 2% maximum swell in A.S.T.M. fuels and oils; high temperature resistance (300° F.—hot oil); flexibility retained with no cracking at —55° F.; resistance to abrasion and no surface deteriorating on aging; and a Durometer hardness (Shore "A" type) up to 80 plus or minus 5.

H. M. ROYAL'S NEW RUBBER AND PLASTIC EXPERIMENTAL LABORATORY

Aiming to fill a vital need in the rubber and plastics industries on the West Coast, H. M. Royal, Inc., has completed a well equipped experimental laboratory at 4814 Loma Vista Avenue, Los Angeles 11, California. The company does not plan to operate the laboratory itself, but will provide the facilities as a service to their regular customers.

The Royal company represents, among others, such firms as John Royle & Sons of Paterson, N. J., Scott Testers, Inc., of Providence, R. I., and William R. Thropp & Sons Co., of Trenton, N. J. A dual service will be provided by the laboratory in that it will serve as a showroom for the machinery Royal handles in the territory, and will be available for use by the regular raw material customers of the company.

A well arranged, well lighted and well ventilated room, the laboratory is equipped with machinery not possessed by even the largest of rubber and plastics manufacturers in the Los Angeles area, according to the Royal concern. There is a three-roll calender and a two-roll mill manufactured by Thropp and a laboratory extruding machine made by Royle.

A Scott tensile tester, a curing press and aging ovens are included among the major facilities. Spacious work benches and cabinets containing complete equipment for complex chemical experiments are provided. All machinery is equipped with automatic stops and other safety devices.

The laboratory also has a complete automatic boiler installation so that the mill, calender, and extruding machine can be used for plastics which require higher temperatures. Press cures can be made in the latest type of electric press which is equipped with the most modern type of temperature control.

T. W. Andrews, who is in charge of machinery sales for the Royal company, installed the various pieces of equipment, assisted by E. C. McLaughlin, who was formerly in charge of the Technical Service Division of the B. F. Goodrich Co. plant in Los Angeles.

Technical service men sent to the West Coast by various Royal principals will use the laboratory while they are in the area. In this way, considerable time will be saved. Previously, such work had to be delayed until the principals returned to their home laboratories.

The company plans to continue adding additional equipment from year to year. In this way it hopes to maintain for its trade one of the finest laboratories available on the West Coast. The idea for the laboratory was conceived by Edward L. Royal, vice-president of the West Coast offices of the Royal Co.

Mr. Royal originated, planned and supervised the construction of the new laboratory with the sole idea of offering a service to the industries his firm serves. The Royal company has long been a supplier of raw materials, machinery and equipment to the rubber and plastics industries.

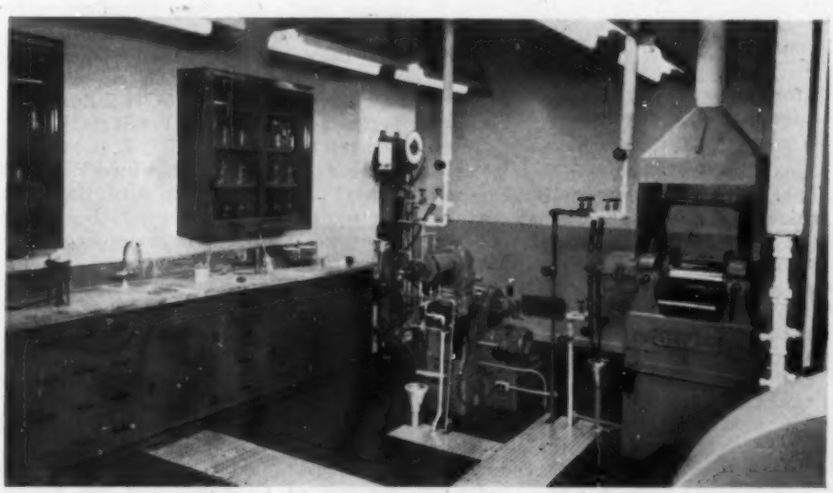
H. M. Royal, Inc., was founded by H. M. Royal at Trenton, N. J., in 1923. The West Coast headquarters was established in the Central Manufacturing District in 1929. Warehousing facilities are served by the Los Angeles Junction Railway.

Expand Bicycle Tire Line

Several additional sizes and types of bicycle tires have recently been added to the cycle tire line manufactured by the Goodyear Tire & Rubber Co. Included are two, single tube tires—28 x 1½ and 26 x 1¾—known as the All-Weather. These were previously made by the company before the war and are now reintroduced for the convenience of cyclists using older model vehicles requiring this size. Also added are two new sizes of Goodyear Double Eagle, the company's premium bicycle tire of heavy duty construction. The new sizes constitute the 20 x 2.125 and 24 x 2.125, both in black and white sidewall, and are companions to the 26 x 2.125 Double Eagle previously announced. Another tire included is the 25 x 1.25 Rib Type, and tube. This tire has a hooked bead and is designed for use on American rims of lightweight bikes.

T. W. Andrews using the Royle laboratory extruding machine.

Lois Bozley making a test on the latest Scott tensile tester.



General view of H. M. Royal's new rubber and plastics laboratory.

E. C. McLaughlin operating the Thropp laboratory mill.

PUBLICATIONS OF THE BRITISH RUBBER PRODUCERS' RESEARCH ASSOCIATION

The British Rubber Producers Research Association, which maintains its laboratories in Welwyn Garden City, Hertfordshire, and its general offices at 19 Fenchurch St., London, E. C. 3, England, regularly issues publications (booklets) reporting on the research work conducted by various members of its staff. Some of these publications represent initial reports on results, others are reprints of articles from various British and American technical journals covering various phases of research. Titles, authors, publication numbers, and abstracts of some recent publications, any of which can be secured without cost from the Association, follow:

Kinetic Studies in the Chemistry of Rubber and Related Materials. I. The Thermal Oxidation of Ethyl Linoleate, by J. L. Bolland (Publication No. 70): The kinetics of the initial stages of the thermal oxidation of ethyl linoleate (by molecular oxygen) have been investigated in the temperature range of 35 to 75° C. From consideration of chemical and kinetic evidence the reaction mechanism has been established: Oxidation chains are initiated by thermal decomposition of ethyl linoleate hydroperoxide (which in the early stages of oxidation is substantially the sole product). The chain propagation reactions are identified as $R— + O_2 \rightarrow RO_2—$ and $RO_2— + RH \rightarrow ROOH + R—$ (where RH represents ethyl linoleate). Chain termination occurs by mutual destruction of the radical chain carriers, *R— and* $RO_2—$.

Peroxidation in Relation to Olefinic Structure, by E. Harold Farmer (Publication No. 71): Interest in autoxidation processes may be directed to two main themes: (1) the mechanism of the incorporation of oxygen and (2) the fate of the various types of peroxide groupings. Before kinetic investigations can proceed, it is necessary to have a detailed knowledge of the structure and breakdown behavior of all known types of organic peroxides. The author has set out to classify peroxides into appropriate structural groups and has endeavoured to relate the course of peroxidation of each class to the structure of the olefin undergoing oxidation. This has led, incidentally, to a reconsideration of the problem of chain scission.

Modern Views on the Chemistry of Vulcanization Changes. Part I—Nature of the Reactions between Sulfur and Olefins, by E. Harold Farmer and F. W. Shipley. Part II—Role of Hydrogen Sulfide, by Ralph F. Naylor. Part III — Reaction of Sulfur with Squalene and with Rubber, by George F. Bloomfield. (Publication No. 72): As indicated by the titles, the work reported in this publication covers the chemistry of vulcanization changes. The titles are self-explanatory.

Kinetic Studies in the Chemistry of Rubber and Related Materials. II. The Kinetics of Oxidation of Unconjugated Olefins. III. Thermochemistry and Mechanisms of Olefin Oxidation, by J. L. Bolland and Geoffrey Gee (Publication No. 74): The first of these two papers presents a brief summary of a kinetic investigation of the oxidation of some representative unconjugated olefins. The aim of this work was to determine the precise nature of the individual reactions leading to the production of an unsaturated hydroperoxide, which was already known to be the first isolable product. It is shown that the whole process comprises a chain reaction, initiated by the production of free radicals from the olefin. These react rapidly with oxygen, and the resulting peroxide radical is converted into hydroperoxide by removing a hydrogen atom from a second olefin molecule, which thus in turn becomes a free radical. This process is repeated until two free radicals react with one another. The second paper considers some possible alternative reactions of these free radicals, and examines their possibility from consideration of their energy requirements. It is shown how the structure of the olefin will influence the relative ease of these processes, and determine whether the peroxide produced are hydroperoxide, polymeric, or cyclic.

Dielectric Relaxation and Viscosity of Long-Chain Dipolar Liquids, by Adolf Schallamach (Publication No. 75): It is known that the dielectric relaxation time and the viscosity of many dipolar liquids of low molecular weight have the same though not necessarily constant temperature coefficient over large temperature ranges. As such a relation suggests a close relation between the two processes, the temperature dependence of five long-chain liquids, geraniol, phytol, phytal, phytyl acetate and di-dihydrocitronellyl ether here determined. It was found that the temperature coefficients are in general not identical but tend to become so at low temperatures. In the case of two alcohols, the viscosity has at higher temperatures a lower temperature coefficient than the relaxation time and it was concluded that the mechanism of viscous flow changes with the temperature. The ester has no well defined relaxation time at higher temperatures and indicates the presence of more than one relaxation mechanisms.

The Interaction Between Rubber and Liquids. VIII. A New Examination of the Thermodynamic Properties of the System Rubber+Benzene, by Geoffrey Gee and W. J. C. Orr (Publication No. 76): This paper describes work undertaken to refine earlier vapor pressure measurements on benzene rubber mixtures. The object was to use the data to calculate the heat of solution of rubber in benzene. It is shown that the heat of solution falls off rapidly when the proportion of benzene exceeds 70%. This is believed to be due to a tendency for the individual molecules to fold back on themselves. It is estimated that in an infinitely dilute solution of rubber in benzene, approximately one quarter of the contacts made by any selected point on a rubber molecule are, on the average, with other parts of the same molecule, and only three quarters of them with benzene molecules.

A Differential Fourier Method for Refining Atomic Parameters in Crystal Structure Analysis, by A. D. Booth (Publication No. 77): This is a mathematical paper concerned with the methods of deducing the detailed structure of a molecule from X-ray diffraction photographs. The normal Fourier series method for obtaining atomic parameters suffers from the disadvantage of requiring the application of graphical interpolation methods in the final stages. These may lead to considerable errors. The new method is derived, which uses the fact that at atomic maxima the *differentials* of the electron density with respect to position are zero. The new method requires considerably less computation than those at present in use, and is suitable for the application of four figure tables of trigonometrical functions.

The Accuracy of Atomic Co-ordinates Derived from Fourier Series in X-Ray Structure Analysis, by A. D. Booth (Publication No. 78): There has been considerable speculation regarding the accuracy of bond lengths and angles derived from X-ray structure analysis. This problem is of very considerable interest since recent work has indicated that significant differences exist between bonds all of which are normally regarded as single. An attempt is made to investigate the problem mathematically and it is shown that there are two principal sources of error: (1) Due to experimental errors in the observed intensity data; (2) Due to termination of the Fourier series at a finite number of terms. Errors due to the first source are shown to be of the order ±.005A, and those of the second ±.02A.

The Structure of Polyisoprenes. VI. An Investigation of the Molecular Structure of Dibenzyl by X-Ray Analysis, by G. A. Jeffrey (Publication No. 80): Earlier work in these laboratories has suggested that in 1:5 dienes (of which natural rubber is an example) the formally single C-C bond midway between two double bonds is actually shorter than a normal C-C bond. The present paper describes work on dibenzyl, another example of this class. Its molecular structure has been redetermined using more extensive X-ray data and three-dimensional Fourier methods. The results, which are estimated to be reliable to about ±0.01Å, show that the three formally single carbon bonds joining the benzene rings have lengths of 1.50, 1.48, and 1.50 Å and make angles of 115° with each other. The departure from the standard lengths of 1.54 Å is significant, and is discussed in relation to analogous systems of 1.5-dienes and the polyisoprenes.

Two New Hycar Rubbers

Two new Hycar rubbers, Hycar OR-25 EP and Hycar OR-25 NS, have been added to the line of synthetic rubbers produced by the B. F. Goodrich Chemical Co., Cleveland, Ohio. Hycar NS and Hycar EP differ only in that a special anti-oxidant has been used in the NS, making it non-staining and non-discoloring. The new Hycar rubbers are said to have these advantages over the regular process Hycar OR-25: they band on process mill speedily; have better extrusion characteristics; excellent high temperature mixing; better fusion and mold flow characteristics; increased building tack for laminated products, such as frictioned stock and calendered sheeting; permanent resiliency, and superior resistance to oil, abrasion, and aging.

Changes at Mohawk Rubber

Several personnel changes were recently announced by the Mohawk Rubber Co., Akron. Charles E. Sauvain, a director of the company and formerly assistant treasurer, has been named treasurer, while Nile E. Ries, formerly factory superintendent, is now factory manager. Mr. Sauvain, associated with Mohawk for 32 years, succeeds Ray E. Bloch, who until the new appointment was president and treasurer, but who remains as president. Mr. Ries, with the company since 1924, succeeds John A. Christie who will now devote his time to research and development. E. H. Whims, previously manager of repair material sales, has been made assistant sales manager of the company.

Barrett Softeners for Butyl

The performance of several of the company's rubber softeners in GR-I (butyl rubber) is covered in the latest technical bulletin issued by the Barrett Division, Allied Chemical & Dye Corp., 40 Rector St., New York 6, N. Y. Designated "Rubber Laboratory Release No. 7," the report covers the use of Dispersing Oil No. 10 as a plasticizing and processing oil in highly-loaded, light colored butyl stocks, the use of Bardol for providing stronger splices in the manufacture of butyl tubes, and the softening and extending qualities imparted by Cumar CX Resin. Copies of the report are available from the company on request.

"Skid-Rid" Retread Material

A new tread known as "Skid-Rid," used for retreading automobile tires and so named because it rids tires of dangerous skids on hardpacked snow and ice, as well as wet pavement, has been announced by the Goodyear Tire & Rubber Co. Skid-Rid is described as not just a surface feature, but a rough, abrasive substance milled right into the camelback. When the recap wears off the thin covering of rubber (approximately 100 miles wear), this abrasive material exposes to the road surface literally thousands of rough edges that greatly increase traction on slippery roads.

Jackson Named Firestone President

Lee R. Jackson

Lee R. Jackson, formerly executive vice-president of the Firestone Tire & Rubber Co., was elected president of the company at a meeting of the Board of Directors held in Akron on January 17. He succeeds Harvey S. Firestone, Jr., who becomes chairman of the board and chief executive of the company. John W. Thomas continues as honorary chairman. Harvey H. Hollinger, formerly secretary, was elected treasurer, and Joseph Thomas, formerly assistant secretary and general counsel, was elected secretary and general counsel. The following officers were re-elected: John J. Shea, vice-president in charge of finance; James E. Trainer, vice-president in charge of production, Harold D. Tompkins, vice-president in charge of sales; Claude A. Pauley, comptroller.

FTC Requests Tire Data

The Federal Trade Commission on February 4 ordered the "Big Four"—U. S. Rubber, Goodyear, Firestone and Goodrich—to supply detailed information for its investigation of tire sales by February 24. Besides other data, the FTC wants the addresses of all customers who purchased over $100,000 worth of tires and tubes last year, and all price lists. Under the law, the commission can impose a limit on sales if it feels price discounts given larger purchasers tends to discriminate against small concerns and promote a monopoly.

Boston Woven Hose History

The interesting history of the Boston Woven Hose & Rubber Co., of Cambridge, Mass., is one of the features of the December 15, 1947, issue of *The Royle Forum*, house organ of John Royle and Sons, Paterson 3, N. J. The history of the organization is traced from its organization in 1878 by Col. Theodore A. Dodge, Robert Cowen and J. Edwin Davis, to the present.

Progressive Railroad Program

Shortly after V-J Day, the Union Pacific Railroad put into operation a carefully conceived plan designed to protect the future of the newly industrialized and increasingly agriculturized west. This program included an institutional advertising campaign in the nation's trade press (including RUBBER AGE) pointing out the industrial advantages of the west, and a general modernization scheme deemed necessary to handle the increased business anticipated. According to a recent report, the over-all program is producing tangible results, with more than a thousand new industries having been located on Union Pacific lines since V-J Day.

Heated Rubber For Airplanes

A heating pad for the inside surface of the jet cowl on an experimental plane now under test is the latest development on heated rubber in airplane construction and operation, according to the B. F. Goodrich Company, Akron, Ohio. In the installation the rubber is bonded to the inside of the jet cowl instead of covering the outside and thus is made entirely free from the onslaughts of the weather, the company claims. While the installation is extremely difficult, performance of the pad has been justified because it has revealed the extensive possibilities of heated rubber as a protector against icing.

Dow Releases Trademark Rights

The Dow Chemical Co., Midland, Mich., has released its trademark rights to the name "saran," permitting it to become the descriptive name of the product. Company officials stated that the action was taken in the interest of simplifying identification on various plastic materials whose chemical names have for years been confusing to press, trade and consumer alike. The term saran applies to a series of thermoplastic resins chemically known as vinylidene chloride copolymers originally developed by Dow in the latter thirties and known especially for their resistance to a wide range of chemicals.

New Silene-Calcene Report

An additional technical bulletin on the application of its pigments in rubber compounding has been made available by the Columbia Chemical Division, Pittsburgh Plate Glass Co., Fifth Ave. at Bellefield, Pittsburgh, Penna. One of a series the company has been distributing in recent months, the latest bulletin is entitled "Silene EF and Calcene T in GR-S-10, GR-S-X-141, and GR-S-X-245." Investigation has indicated that these three polymers have proved the most interesting for footwear compounding. Copies of the bulletin are available on request to the company.

Marketing of a complete line of phenolic molding powders has been started by the Chemical Department, General Electric Co., Pittsfield, Mass. The line includes general purpose, high heat resistant, and impact resistant plastic materials.

NAMES IN THE NEWS

HARRY P. SCHRANK, vice-president of the Seiberling Rubber Co., was recently elected president of the Akron Area Council of the Boy Scouts of America.

BOYD E. BRIDGWATER, vice-president of the Bridgwater Machine Co., has been elected president of the Akron Chamber of Commerce for 1948.

MATTHEW S. FOX, a partner of Charles Slaughter & Co. has been elected to the Board of Governors of the Commodity Exchange, Inc., New York, as a representative of the Rubber Trade Group. H. E. MEYER, president of the Meyer & Brown Corp., was elected a vice-president of the Exchange heading the Rubber Trade Group.

GEORGE M. SCATTERGOOD, formerly assistant manager of the drug sundries department of the Armstrong Cork Co., Lancaster, Penna., has been appointed manager of the department.

EARLE S. DAY, associated with the Collyer Insulated Wire Co., Pawtucket, R. I., for many years, has been appointed general manager of that company, succeeding W. H. BARNEY who remains as vice-president of the firm.

C. E. "CHARLEY" REYNOLDS, associated with the Cambridge Rubber Co. since 1929, most recently as technical director of plant operations, has left that organization and is now with the Odell Co., Watertown, Mass.

GEORGE W. LUMM, formerly associated with the Standard Oil Co. of Ohio as an industrial engineer, has joined the Crown Rubber Co., Fremont, Ohio, as general sales manager.

BRADLEY A. SMITH, formerly associated with the Firestone Industrial Products Co. as a sales engineer, recently joined the research laboratory of the Flintkote Co. at East Rutherford, N. J., as group leader in charge of research and development of latex and latex compounds.

EDWIN S. DUNBAR, JR., has recently been appointed Eastern Manufacturer's Sales Representative for A. Schrader's Son Division of the Scoville Manufacturing Co., following the untimely death of DAVID NOBLE.

CHARLES A. MAHER, formerly associated with the Sales Division of the Office of Rubber Reserve, has joined Frederick J. Horn, Akron agent for Littlejohn & Co.

JOHN E. MARTIN, formerly vice-president and a director of American Type Founders, Inc., has been appointed president of the Firestone Steel Products Co.

PAUL J. FLORY, in charge of fundamental research for the Goodyear Tire & Rubber Co., became the first industrial chemist to conduct the George Fisher Baker series at Cornell University, when he began a series of lectures to graduate students on February 9.

FRED L. DOWNS, associated with the American Steel & Wire Co. as rubber chemist for many years, has left that organization to become rubber technologist at the Portsmouth (N. H.) Naval Shipyard.

ROBERT ALLISON, associated with the wire and cable division of the General Electric Co. at Bridgeport, Conn., for the past few years has replaced S. T. POWELL as manufacturing manager of that division.

EVERETT MORSS, president of the Simplex Wire & Cable Co., has been elected to the Board of Directors of Arthur D. Little, Inc., Cambridge, Mass., industrial research organization.

C. K. PERKINS, formerly general sales manager, has been named director of sales of the Bauer & Black division of the Kendall Co., Chicago, Ill. E. H. BROWN, formerly sales manager, was appointed general sales manager.

H. H. HOLLINGER, treasurer of the Firestone Tire & Rubber Co., has been elected president of the Portage Country Club in Akron, Ohio. HARRY P. SCHRANK vice-president in charge of production at the Seiberling Rubber Co., was elected vice-president, while E. P. LAMBERT, rubber broker, was elected secretary.

J. P. SEIBERLING, president of the Seiberling Rubber Co., and BOYD BRIDGWATER, vice-president of the Bridgwater Machine Co., have been named to the Small Business Advisory Committee of the U. S. Department of Commerce.

MILTON J. SCOTT, research chemist at the Monsanto Chemical Co.'s Plastics Division in Springfield, Mass., since 1942, has been appointed assistant director of research of the company's Merrimac Division in Everett, Mass.

LAWRENCE W. BASS, director of research and development of U. S. Industrial Chemicals, Inc., has been elected a vice-president of that organization.

DR. L. C. HATCH, assistant medical director of the Akron plants of the Goodyear Tire & Rubber Co. since 1946, and associated with the Goodyear organization since 1942, has been named medical director of the company.

Andrews Joins Richardson Company

Frank Andrews

Sid W. Richardson has announced the appointment of Frank Andrews as sales manager of the Sid W. Richardson Carbon Co., recently organized to operate the Odessa, Texas, carbon black plant purchased from the War Assets Administration. The new company will maintain headquarters at 628 Fort Worth Club Building, Fort Worth, Texas.

Well known in the liquefied gas, solvents, rubber and carbon black industries, Mr. Andrews has been with the Phillips Petroleum Co. for the past 19 years and resigned as manager of that company's Chemical Products Department to accept his new position. His original experience with Phillips, starting in 1929, was in the liquefied gas field, but in 1940 he organized the sales department for the Hycar Chemical Co. and in 1943 started the marketing division for Philblack. Later, as manager of the Chemical Products Department he became associated with the solvents market.

The Odessa plant now has an annual capacity of about 53,000,000 pounds. This is being increased in the next few months to approximately 71,000,000 pounds by the addition of a third unit. Most of the material for this expansion is now on the site awaiting erection. When completed, this plant will be one of the most modern channel black plants in the world.

In addition to the carbon black plant, the new organization is building a very large natural gasoline plant in the Keystone Field near Kermit, Texas. When completed, this plant will have a daily average production of about 86,000 gallons of propane and butane and 120,000 gallons of natural gasoline.

The refinery at Texas City, Texas, is now producing some of these products and its facilities will also be enlarged to furnish the additional types that may be required. Further other manufacturing projects, to better utilize the oil and gas reserves controlled by Mr. Richardson, are well along in the development stage.

Paper Solves Filler Problem

The use of rubber sealing compounds to fill in the joints between concrete squares on airport runways, as well as on roads and highways, is rapidly expanding. New heating methods have been developed in recent years for preparation of the rubber compound on the site so that it will perform satisfactorily.

One problem in this operation is the use of a proper filler to dam up the bottom of the crack until the rubber solidifies, with rope and oakum generally being used for such purposes. In some operations, this type of filler proved unsatisfactory.

A filler material satisfactory in all respects is said to be Kraftcord, an industrial paper made by E. W. Twitchell, Inc. Kraftcord was used by the James Gibbons Co., general contractors of Relay, Maryland, at the Atlantic City (N. J.) Naval Airport. A special four-wheeled, hand-operated machine was developed to force the three-eights to half-inch paper-cord packing into the joints.

According to the Gibbons firm, the paper cord is extremely satisfactory as a compressible caulking material and the fact that it is saturated with hot rubber compound insures its longevity. Use of the paper cord is also said to eliminate the costly "dropping out" of the rubber compound. E. W. Twitchell, Inc., is located in Philadelphia, Penna.

Adhesive For Silicone Rubber

A new adhesive expressly designed for bonding silicone rubber to itself and to glass, metals and ceramics has been developed by the Chemical Department of the General Electric Co., Pittsfield, Mass. Known as G-E Adhesive No. 12509, the new type bonding agent, possessing qualities similar to silicone rubber, remains flexible and resilient over temperatures ranging from —70° F. to 520° F. and withstands continuous temperatures of 300° to 350° F. in a dry air circulating oven. It can also be used to bond glass to glass, glass to metals, and metals to metals.

Deluxe Combination Heel

A rubber heel, named the Deluxe, combining high grade rubber and Neolite, has been added to the regular line of Goodyear Tire & Rubber Co.'s shoe products. Manufactured in Goodyear's Windsor, Vt., plant, the heel is described as being made of rubber, with an insert of Neolite compound. Non-skid and long wear are the features attributed to the new product. The Deluxe heel completely rounds out the line of products now offered to the shoe trade by Goodyear.

Moves to Business District

The Industrial Rayon Corp. has announced the transfer of its executive headquarters, general office staff, purchasing, production and engineering personnel to the Union Commerce Building in Cleveland, Ohio. This completes the move to business district quarters started in the fall of 1945, when the treasury and accounting departments moved to the new building.

Outcault Named Sales Manager

Harry E. Outcault

Harry E. Outcault, assistant sales manager of zinc oxide sales for the St. Joseph Lead Co., 250 Park Ave., New York, for the past few years, has been named manager of such sales, effective January 23. The St. Joseph Lead Co. is one of the country's leading producers of lead, zinc and zinc oxide.

Mr. Outcault has been associated with the company since 1931, when their new electro-thermic zinc oxide plant went into production. He served as Manager of Technical Service and more recently as Assistant Sales Manager. Prior to that time he was associated with the New Jersey Zinc Company—five years in the Research Division at Palmerton, Pa. and four years in Technical Service in the Sales Department in New York City. He is well-known and highly regarded for his technical service work throughout the rubber, paint, ceramic and other industries using zinc oxide.

Mr. Outcault graduated from Ohio State University in 1917 with the degree of B. Ch. E. and associated himself early in his professional career with professional societies and is actively engaged in their work. He is a member of the American Chemical Society, American Institute of Chemical Engineers, American Ceramic Society, American Society for Testing Materials, National Paint, Varnish, & Lacquer Association, Commercial Chemical Development Association and Chemical Market Research Association. At the present time he is serving as Chairman of the Division of Rubber Chemistry of the A.C.S.

Carbide & Carbon Buys Plant

The Carbide & Carbon Chemicals Corp., New York City, has purchased a butadiene and styrene plant at Institute, W. Va., from the Reconstruction Finance Corporation for $9,350,000. Federal tax on the deed, said to be the most valuable ever recorded at Charleston, W. Va., was $10,285.

Announce Golf Ball Developments

Two major developments in the construction of golf balls—the use of silicone "bouncing putty" as the core and the use of an electronic winding device which controls the tension of the thread wound around the center of the ball-have been announced by the U. S. Rubber Co. The winding device consists of a photo-electric tube wired up to a complicated system of relays, amplifiers, etc. A narrow beam of light shines from a tiny bulb through a lens on to the photo-electric tube. The golf ball thread is in the path of the light, vibrating like the strings of a violin. Thus the beam of light is interrupted when the vibrating thread crosses its path, transmitting impulses of light to the photo tube. The tube is adjusted to take the impulses at a pre-set uniform frequency. When they come too fast or too slow an electronic brake applies more or less pressure on the thread, bringing it back into "tune". This checking and adjusting automatically takes place in a fraction of a second, thus keeping the tension virtually constant throughout the winding process. Silicone "bouncing putty" is said to have more resilience that any other substance ever used in a golf-ball center, and is a member of a large family of silicones developed by General Electric Co. during World War II.

Correction on Red Book

Our attention has been called to the fact that the trade name "Vulcanols", used by the Alco Oil & Chemical Corporation, of Philadelphia, Penna., to distinguish its line of natural and synthetic compounded latices, was incorrectly spelled in that company's advertisement on page 605 of the 1947 RUBBER RED BOOK. The company also features a complete line of aqueous pressure sensitive and heat sensitive adhesives under the same brand name, as well as other products, including "Soladine," a staple, rapid wetting agent.

Reel Joins Dayton Rubber

Ralph Reel, formerly vice-president in charge of research and development of the Pharis Tire & Rubber Co., has joined the Dayton Rubber Export Co. as technical service manager. In his new position, Mr. Reel will spend much of his time abroad, acting in an advisory capacity, and has already sailed for Europe. He will spent two or three months in Norway and later will go to Switzerland, Denmark, Holland and Brazil. Headquarters of the Dayton Rubber Export Co. are maintained at Dayton, Ohio.

Form Standard Adhesives Co.

Formation of the Standard Adhesives & Chemical Co., at 57-01 59th Street, Maspeth, L. I., N. Y., to manufacture latex compounds of all types, including adhesives, coatings and impregnants was recently announced. The phone number is DAvenport 6-1317. David Persch, formerly associated with the Flintkote Co., is associated with the new firm.

NEW POLYMERS AUTHORIZED BY OFFICE OF RUBBER RESERVE, RECONSTRUCTION FINANCE CORPORATION

Listed below are types and properties of new experimental GR-S polymers (including GR-S latices) which have been authorized by the Office of Rubber Reserve, Reconstruction Finance Corporation, since publication of those in our previous issue. Procedures for the distribution and sale of these polymers will be found in our October, 1945, issue. Normally, experimental polymers are produced only at the request of the consumers with 20 bales of the original run set aside for distribution to other interested companies for their evaluation. Such rubber is available in quantities of one or two bales upon request to the Sales Division of Rubber Reserve within six months after the experimental polymer was produced. Subsequent production runs are made if sufficient requests are received to warrant it.

X Number	*Manufacturing Plant*	*Date of Authorization*	*Polymer Description*	*Special Characteristics*
X-427 GR-S	Goodrich, Port Neches	12/24/47	Continuous GR-S-10 at lower conversion and stabilized with 1.25 per cent of Stalite. GR-S-10 stabilized with Stalite is GR-S-18.	Some consumers find that lower conversion GR-S polymers give better processing. For January production.
X-428 GR-S	U. S. Rubber, Borger	1/12/48	GR-S-16 stabilized with 1.5 per cent EFED instead of Stalite. This is a rosin soap emulsified GR-S having a 95 to 105 Mooney range.	For January production.
X-429 GR-S Latex	U. S. Rubber, Naugatuck	12/29/47	GR-S-85 latex with a contained polymer Mooney range of 105 to 120.	For January production. Specification Limits: pH, 8.5 to 9.25; Residual styrene, 0.50% maximum; Total solids, 26.5 to 29.0%.
X-430 GR-S	Goodrich, Port Neches	12/30/47	Continuous GR-S-10 at lower conversion and stabilized with 1.25% PBNA.	Only difference between X-430 GR-S and X-427 GR-S is in stabilizer. For January production.
X-431 GR-S	Goodyear, Houston	about 1/20/48	GR-S-20 latex stabilized with R-2015 and coagulated by special dilute alum technique to keep water soluble materials to an absolute minimum. Mooney range expected to be from 50 to 58.	A non-staining, non-discoloring and lower Mooney variation of X-361 GR-S. X-431 GR-S, when properly compounded, will have extremely low water absorption comparable to deproteinized natural rubber. Should be evaluated for all applications demanding low water absorption and long retention of electrical properties. Price same as Standard GR-S. For February production.

May Purchase Stockpile Rubber

Negotiations are currently being conducted under which the United States may purchase from Great Britain a substantial amount of natural rubber for stockpile purposes. Although the specific amount involved in the negotiations was not revealed, it is known that the British Board of Trade purchased approximately 100,000 tons of all grades of rubber from Malaya before it ended its purchase program at the end of 1946. On January 20, the Board of Trade announced that in response to a request from the United States it had furnished details of the rubber stocks held by the British Government and had also given some indication of the amounts that government might be prepared to release. The rubber held by the British Government has been available to British rubber manufacturers at a price of approximately 26½c a pound, f.o.b. warehouse.

Firestone Buys Des Moines Plant

Completion of details for transfer of the Des Moines, Iowa, wartime rubber plant to the Firestone Tire & Rubber Co. for $3,425,000 was announced on January 20 by the War Assets Administration. The plant, built by the Government in 1945 at a cost of $6,485,000, was operated by Firestone during the war, producing heavy duty tires for military use. Since the war the company has continued to operate the plant at capacity, manufacturing tires for farm tractors and other heavy equipment.

Name Special Suppliers Committee

C. M. Baldwin, sales agent of 1620 Field Building, Chicago 3, Ill., has been named chairman of the Suppliers Committee which will sponsor the cocktail party to be held on April 22 at the Hotel Sherman preceding the banquet of the Rubber Division, A.C.S. Other members of the committee are: W. N. Crumpler (C. K. Williams Co.), S. A. Davis (C. P. Hall Co.), J. P. Sheridan (N. J. Zinc), W. O. Hamister (Naugatuck Chemical), and J. A. Myers (United Carbon).

Fire at General Sponge Corp.

Considerable damage was caused at the plant of the General Sponge Corporation at 1195 Atlantic Ave., Brooklyn, N. Y. as the result of a three-hour fire on February 3. The company fabricates various specialties from sponge rubber. The fire was marked by intense smoke and nine firemen were overcome before it was extinguished. The cause of the fire and the specific amount of damage was not immediately determined.

Heel and Sole Compounding

A special report on the use of Philblack A in heel and sole compounding has been made available by the Phillback Division, Phillips Petroleum Co., Akron 8, Ohio. Issued as Bulletin No. 9 in the company's present series of technical reports, it includes both formulas and physical data for both heels and soles. Copies are available on request to the company.

Report on Wage Violations

Violations of the minimum wage, overtime and child-labor provisions of the Fair Labor Standards Act and the Public Contracts Act were found in 69 per cent of the 257 inspections in the rubber products manufacturing industry, according to the 1947 Annual Report of the Wage and Hour and Public Contracts Divisions, U. S. Department of Labor. Just issued to the Congress, the report, which covers the 12 months ended June 30, 1947, shows that the rubber products industry inspections resulted in back wages amounting to $97,207 agreed or ordered to be paid to 2,478 employees. While most violations revealed had resulted from improper computation of overtime pay, it was found also that there were employers who had failed to pay some of their employees the 40-cents-an-hour minimum wage required under the Fair Labor Standards Act—the Wage and Hour Law.

Crown Rubber Tripling Space

The Crown Rubber Co. of Fremont, Ohio, has begun a building program to triple its present facilities. Operating 24 hours daily, and seven days a week, the firm has been unable to catch up with its backlog of orders. New warehouse and office quarters are being erected and present quarters will be entirely converted into manufacturing purposes. The company manufactures rubber stair treads in various widths and colors, and has established a country wide sales force.

Personnel Changes at Naugatuck

Several changes and transfers of its personnel have been announced by the Naugatuck Chemical Division of United States Rubber Co., Donald L. McCollum, formerly factory manager of the Division's plant at Naugatuck, Conn., has been appointed manager of reclaimed rubber. Philip E. Rice, until recently factory manager of the synthetic rubber plant at Institute, West Va., is returning to the Naugatuck plant as factory manager, succeeding Mr. McCollum. Russell S. Tobias, formerly materials superintendent at the Naugatuck plant, is now purchasing agent for the Division, while Howard R. Gaetz, formerly superintendent of the synthetic rubber plant operated at Naugatuck, has been made manager of sales and production coordination of the Division. A. K. O'Keefe, who was production superintendent at the Institute plant, is now superintendent at the Naugatuck synthetic rubber plant, succeeding Mr. Gaetz.

Denman Low Pressure Tire

The Denman Tire & Rubber Co. of Warren, Ohio, has announced marketing of the new Denman Super-Safety tire, a special low pressure tire for luxury passenger cars. A new feature of the Denman Super-Safety tire is a red rubber inside shock pad consisting of an extra ply of heat-resisting rubber designed to dissipate heat and to give greater protection against blowouts and bruise damages. Every Denman handcrafted Super-Safety tire is guaranteed against all defects in materials and workmanship. The guarantee is said to be backed by a country-wide adjustment policy which permits authorized Denman dealers to make on-the-spot adjustments on any Denman tire.

Junior Bowling Ball

The Manhattan Rubber Junior Bowling Ball is now available for youngsters for whom the regulation ball is too large or too heavy, according to a recent announcement by the Manhattan Rubber Division of Raybestos-Manhattan, Inc., Passaic, N. J. The new ball, measuring 7½ inches in diameter and running in weight between 10 and 12 pounds, has been developed for children up to 12 years of age, although it is suitable for older boys and girls. The Junior Bowling Ball is made in the same manner and balance and of the same materials as the regular Manhattan Ball. Distributors are being provided with equipment to enable them to drill the smaller ball to the bowler's individual grasp.

Issue Plantation Circulars

The Botanical Division of the Rubber Research Institute of Malaya, Kuala Lumpur, F.M.S., recently issued two new circulars on plantation activities. One is entitled "Budgrafting without Waxed Budding Tape" (Circular No. 25) and the other "Notes on Hedge Planting of Rubber" (Circular No. 26). Copies of these circulars are available from the Institute on request.

General Expands Research Staff

G. H. Stempel, Jr.

Several changes in the research division of the General Tire & Rubber Co. have been announced by G. H. Swart, director of research, in connection with the company's expansion and correlation program. Dr. G. H. Stempel, Jr., formerly associate professor of organic chemistry at the Carnegie Institute of Technology has been named assistant director of research. Dr. J. E. Abelard, formerly chief physical chemist at General, was appointed director of synthetic rubber research and development. Dr. G. S. Schaffel, associated with the company since 1946, was named director of plastics research and development. Dr. H. L. Wunderly, formerly a professor at Notre Dame University, was appointed director of analytical research. Dr. H. T. Roy, previously associated with Johnston & Jennings Co. of Cleveland, Ohio, was named director of all activities of the Aerojet Division of Azusa, Calif. Kermit Weinstock, associated with General since 1943, was named acting head of physical testing and compounding research.

RMA Manual On Tire Costs

A detailed formula for cutting ton mile tire costs and wringing extra mileage from heavy duty casings has been offered to the users of off-the-road trucks, tractors and earth-moving equipment, by the Rubber Manufacturers Association in a newly published 40-page manual. Illustrated with both halftone cuts and cartoon style pictures of the enemies of long tire service, the manual goes into every aspect of tire use and care in a field where operating conditions and techniques differ completely from those applicable to over-the-road highway equipment. Seven pages are devoted to tables setting forth proper loads and inflations for all of the tires used in earth-moving and logging services. Free reprints of sections of the manual are being made available to operators of off-the-road equipment through their dealers, according to the Association.

Becco Zinc Peroxide 55%

The Research Department of the Buffalo Electro-Chemical Co., Inc., Buffalo 7, N. Y., is currently conducting an investigation with regard to the use of active oxygen compounds in connection with rubber stocks. It has already been determined that Becco Zinc Peroxide 55%, one of the company's specialties, finds application as an auxiliary vulcanizing agent which simultaneously provides zinc oxide as filler and pigment. Work is currently in progress based on the assumption that a combination of sulfur and peroxide vulcanization might give improved results, particularly with certain types of synthetic rubber. The Buffalo concern is one of the largest producers of active oxygen compounds in the world and several of its products act as promoters in the emulsion polymerization of synthetic rubbers, including ammonium and potassium persulfate, and various hydrogen peroxides.

Additional Communications

The Rubber Foundation, P. O. Box 66, Delft, Holland, has issued Communication Nos. 64 to 67, as follows: "Determination and Occurrence of Iron in Crude Rubber" (No. 64); "Determination of the Rubber Content of Hevea Leaves" (No. 65); "Influence of the Presence of Traces of Strong Acids on the Durability of Crude Rubber" (No. 66); "Mixing Latex and Portland Cement" (No. 67). These four reports, which originally appeared in the *India-Rubber Journal*, were all prepared by G. J. van der Bie. All four are contained in a single booklet, copies of which can be secured without cost from the Rubber Foundation on request.

Minnesota Mining Buys Plant

The Minnesota Mining & Manufacturing Co. has purchased the government-owned aircraft factory known as Fleetwings Plant No. 2 in Bristol, Penna., from the War Assets Administration. The new owner plans the immediate expenditure of about $650,000 on conversion and improvement of the plant, which it will occupy for the manufacture of adhesives and tapes. The property comprises 14.6 acres and includes three one-story buildings containing about 235,000 square feet, which were completed by the government in 1942 for occupancy by the Fleetwings Division of the Kaiser Cargo Co.

Drying Tower Described

A novel drying tower used in the production of coated fabrics by Siemens-Schuckertwerke, A. G., Germany, is described in a short report now on sale by the Office of Technical Services, Department of Commerce. The report contains several photographs and drawings illustrating the drying tower, coating machines and buildings. Mimeographed copies of the 11-page report (PB 2335-S; Survey of German Coated Fabrics Industry; Supplement No. 1) sells for 50 cents.

OBITUARIES

Richard J. Schmidt

Richard J. Schmidt, pioneer in tire mold and rubber machinery manufacturing, and treasurer and factory manager of the Akron Equipment Co., Akron, Ohio, died on January 22 after a short illness. in Akron. He was 60 years old. Mr. Schmidt came to Akron from Germany 55 years ago. After his education in Akron schools he worked for a short time at the Akron China Co., and the Goodyear Tire & Rubber Co., Later, while working for the Williams Foundry & Machine Co., Mr. Schmidt worked on the first non-skid tire molds made in Akron. In 1917 he helped in the organization of the Akron Equipment Co., with which concern he was connected until his death. Mr Schmidt was a member of the Izaak Walton League and the Congress Lake Club in Akron. Services were held in Akron on January 26 with interment in Mount Peace Cemetery. He leaves a widow, two sons and two daughters.

Julius F. Roten

Julius F. Roten, vice-president and director of L. Sonneborn Sons, Inc., New York, oil refiners and manufacturing chemists, died on January 24 at Mount Sinai Hospital in New York City. Mr. Roten, who was 59 years old, joined the Sonneborn Co. in 1905. An authority on petroleum derivatives, he was instrumental in the development of improved methods of refining white mineral oils, petrolatums and petroleum sulfonates, and in creating new uses for these products in the manufacture of a great variety of end-products including rubber, plastics, pharmaceuticals and paper. Mr. Roten was also a partner in Sonneborn Bros., Dallas, Texas, and a vice-president of W. H. Daugherty & Son, Petrolia, Penna. He was a founder of the Oil Trade Association of New York, and a member of the American Petroleum Institute and the Quaker Ridge Country Club. Mr. Roten is survived by his wife, a daughter and a son.

Lee Barroll

Lee Barroll, vice-president of the affiliated Whitehead and Goodall Rubber Companies, died of a heart ailment on January 12 at the Whitehead plant in Trenton, New Jersey. He was 60 years old. Born in Elizabeth, N. J., Mr. Barroll attended the Pingry School there and was graduated from Harvard University in 1909. Mr. Barroll, whose home was on Old Ford Road, Huntington Valley, Penna., was also secretary of the United Public Utilities Corporation of Wilmington, Del. He had been associated with the Whitehead and Goodall Rubber Companies since 1935. Previous to that time he was in the investment business in Baltimore, Md. He is survived by his wife.

Harry J. Hunt

Harry J. Hunt, for the last ten years sales manager of the Dayco roller division of the Dayton Rubber Co., Dayton, Ohio, died at his home in Dayton on January 3, after a long illness. He was 63 years old. A native of Dayton, he attended Fairview primary school and after an apprenticeship in tool-making, joined the National Cash Register Co. He later became supervisor of apprentices. After leaving NCR to become works manager of the Duro Co., Mr. Hunt set up training plans for students at the University of Cincinnati, Antioch College and various Dayton high schools. He left the Duro Co. in 1927 to establish his own concern, the Trupar Mfg. Co., which made pumps and refrigerators. He then joined Dayton Rubber. A member of the flood prevention committee and a leader in YMCA activities, Mr. Hunt also served as a deacon of the First Baptist Church and helped set up the Dayton Community Chest. He leaves a widow.

Grannell E. Knox

Grannell E. Knox, New Jersey sales manager of the Manhattan Rubber Division of Raybestos-Manhattan, Inc., and an employee of the company for fifty years, died on January 19 of a heart attack at the company's plant in Passaic, N. J. He was 66 years old. Mr. Knox was born in New York City and joined the Manhattan rubber concern in 1898. He was transferred to Passaic in 1905 and became state sales manager in 1914. He was an Elk, past president of the Passaic Rotary Club and was active in civic and boys' club affairs.

David Noble

David Noble, Manufacturer's Sales Representative in the Eastern Territory for A. Schrader's Son Division of the Scovill Manufacturing Co., died suddenly on December 1, 1947, in New York City, while en route to Philadelphia on a business trip. Mr. Noble was born in Scotland and was a graduate of Boys High School, Brooklyn, New York, and had attended Bucknell and Harvard Universities. He had been connected with the Schrader firm for the last 23 years.

Eugene F. Brownsworth

Eugene F. Brownsworth, manager of the jar ring and tape division of the U. S. Rubber Co. in New York until his retirement last October, died on January 19 in the New Rochelle (N. Y.) Hospital. He was 65 years old. Mr. Brownsworth was born in Philadelphia, Penna., and joined the U. S. Rubber Co. 38 years ago. He was a member of the Masons and the Larchmont, N. Y., Shore Club.

Clifford B. LePage

Clifford B. LePage, assistant secretary of the American Society of Mechanical Engineers for the last thirty years, died of a heart attack on January 15 in Hartford, Conn., where he had been attending a meeting of the American Standards Association. He was 68 years old. Mr. LePage was born in New York and obtained the degree of Master of Engineering from Stevens Institute of Technology in Hoboken, N. J., in 1902. He worked as a draftsman in Westchester and Nassau Counties, New York, and as an engineer and designer for the United Telpherage Co. of New York. From 1903 to 1921 he was instructor and then professor of physics at Stevens Institute. He became assistant secretary of the A.S.M.E. in 1918 and was secretary of its standing committees on research, standardization, power test codes and safety. He was assistant director of the Secretariat for Prime Mover of the International Electrotechnical Commission and was a member of many technical and scientific fraternal organizations. His wife survives.

William P. Wright, Sr.

William P. Wright, Sr., manager of the standards department of the General Tire & Rubber Co., Akron, Ohio, died of a heart attack on January 9 at the City Hospital in Akron. He was 52 years old. Born in Pliny, W. Va., Mr. Wright came to Akron 29 years ago, and had worked for General Tire since then, starting as a tire builder. Interested in public speaking, he had organized and directed the Speaker clubs at the company. He was also a member of Post 19, American Legion. Services were held on January 12 at the Adams funeral home. He leaves a wife and four sons.

Herron Bros. Reorganized

The firm of Herron Brothers & Meyer, suppliers of pigments to the rubber and other industries, has been reorganized and incorporated under the name of Herron Bros. & Meyer, Inc. W. A. Herron, former chief of the New York office, has been elected president. John W. Herron, previously head of the company, remains as director. Besides the Herron brothers, directors of the new corporation are Owen J. Brown, Jr., vice-president and general sales manager of Godfrey L. Cabot, Inc. of Boston, Mass., F. C. Fernald, Cabot general counsel, and B. A. Wilkes, director of technical sales of the Cabot company.

Change Standard Oil Name

The name of the Standard Oil Co. of New Jersey has been changed to the Esso Standard Oil Co. The change was made to give formal recognition to the close association which has developed in the public's mind over a period of years between the corporate name of the company and its Esso trade-mark. Home offices for the Esso Company are located at 15 West 51st St., New York 19, N. Y.

R.T.A. Elects 1948 Officers

The Rubber Trade Association of New York, Inc., which maintains headquarters at 15 William St., New York 5, N. Y., has announced the election of its officers for 1948. Bancroft W. Henderson and R. D. Young were re-elected chairman of the board and president, respectively. Philip Billhardt was elected treasurer, succeeding Jacobus F. Frank. B. G. Davy was re-elected secretary. The following committee chairmen were also named: *Arbitration,* G. L. Scheinler; *Business Conduct,* R. Badenhop; *Clearing,* F. T. Koyle; *Membership,* A. L. Grant; *Rules,* F. T. Koyle; *Traffic and Warehouse,* E. Schlader. The Finance Committee is composed of A. Bendixsen, P. Billhardt and J. Louis, and members of the Nominating Committee include A. S. Krall, H. E. Meyer and H. E. Poel. R. S. Hamilton is chairman of the Panel of Quality Arbitrators.

Tread-Stock Cover For Hose

The Mechanical Goods Division of the Goodyear Tire & Rubber Co. has announced the development of a new type tread-stock cover for its Redwing air hose line. The new hose cover utilizes a cushioning stock similar to that developed recently by Goodyear compounders for tire treads. Softness of this heavy gauge stock is said to afford maximum resistance to extreme abrasion and gouging common to most air service conditions. The hose is reinforced with a cabled cotton body for greater carcass strength and flexibility. The cover is manufactured in two types—two-braid standard for pneumatic tool service, and three-braid heavy duty for air-drill usage. Hose sizes range from ⅜ inch to 1½ inches in 25 to 50 foot lengths or 450-foot reels.

Report on German Accelerators

Details of the manufacturing processes for 22 rubber accelerators produced at various I. G. Farbenindustrie plants in Germany and sold under the well-known brand name of "Vulkacit," are described in a 91-page report made available by the U. S. Department of Commerce. The report tabulates each of the accelerators according to chemical composition, physical state, classification, costs, etc., and summarizes the manufacturing methods. Numerous schematic sketches of the manufacturing equipment are included. Copies of the report (PB-78997) in mimeographed form can be secured for $2.50 each from the Office of Technical Services, Department of Commerce, Washington 25, D. C.

Election at Harris Products

Charles H. Bitzer, formerly vice-president of the Harris Products Co., was recently elected president of that company, succeeding R. D. Schmidt. R. G. Bradley, formerly sales manager, was elected vice-president in charge of sales, and Dan T. Bradley, a vice-president, was elected vice-president in charge of engineering. Harris Products maintains a rubber factory at Milan, Ohio.

Holmes Joins Jefferson Chemical

J. W. "Joe" Holmes

J. W. "Joe" Holmes, associated with the Polymer Corporation at Sarnia, Ontario, since 1942, has been appointed sales manager of the Jefferson Chemical Co. He will be in charge of sales of commercial products and will make his headquarters at 30 Rockefeller Plaza, N. Y. Jefferson Chemical Co. is owned jointly by the Texas Co. and the American Cyanamid Co. A graduate of McGill University, Mr. Holmes for several years handled technical sales of organic chemicals and neoprene for Canadian Industries, Ltd., in Montreal and Toronto. He joined the Polymer Corp. in 1942 as executive assistant to the managing director and later was placed in charge of technical service for butyl rubber. In 1945 he was made manager of the sales and technical service division, handling GR-S and butyl, as well as the sale of natural rubber in Canada. Mr. Holmes is a member of the American Chemical Society and the Chemical Institute of Canada. He is a former chairman of the Ontario Rubber Group.

German Buna Production Increases

Production of buna rubber at the Schkopau Works in the Russian Zone of Germany increased by 50 percent in 1947 over the preceding year, jumping from 2,000 tons a month to 3,000 tons a month, according to a recent report from Berlin. The Schkopau Works was said to be supplying buna to some 90 rubber manufacturers, three of whom are producing automobile tires in small quantities.

Weston Acquires Tagliabue Assets

The Weston Electrical Instrument Corporation, of Newark, N. J., recently acquired the inventory and machinery and other assets of the C. J. Tagliabue Manufacturing Co., of Brooklyn, N. Y. The Tagliabue concern has long manufactured a varied line of recording and control instruments.

Classified List Available

A classified list of 1,800 reports on German, Japanese and American wartime technology available in printed form is now on sale by the Office of Technical Services, Department of Commerce. Unlike most OTS reports, which are available in photostat or microfilm form only, the reports included in the 57-page classified list are available in mimeograph, multilith, or other printed form. For convenience the reports are indexed in three parts: Part I is a classified subject list of reports giving author, title, date, number of pages, price, PB number and volume and reference to the *Bibliography of Scientific and Industrial Reports,* where an abstract of the report may be found; Part II lists the original series numbers; Part III is PB number and page number index of Part I. Multilith copies of the listing are available through OTS at a cost of 75 cents.

Rome Cable Corporation

Nine Months to December 31. Net profit of $797,700, which is equal to $1.94 a common share, against $735,048, or $1.84 a share, for the similar period last year. Net profit for the December quarter was $243,437, or 59 cents a share, which compares with $264,134 or 65 cents a share for the corresponding period last year. These figures exclude copper profit of $85,576 for the nine months and $112,862 for the 1946 period, nor have there been deducted $81,100 and $94,000 for extraordinary moving expenses incurred during the two periods respectively, against which a reserve was provided in prior years. These excluded items are net after adjusting for applicable income taxes.

Lee Rubber & Tire Corp.

Year to Oct. 31: Net income of $2,402,305, which is equal to $9.47 a share on 253,584 common shares, and compares with $2,153,338, or $8.91 each on 241,509 common shares, in the previous fiscal year, when $425,000 was provided for contingencies. Although sales increased $5,047,746 over the previous year, net profit declined from 8 cents a dollar of sales in 1946 to 6.4 cents a dollar of sales in 1947, partly because of reduction in tire prices in June and higher material and operating costs prevailing in the last half of the year. Book value as of October 31 was equal to $61.38 a share.

Gigantic Belt Conveyor System

A contract to build a seven-mile long installation of conveyor belts, the biggest postwar belt application and the second longest ever constructed, has been awarded to the Goodyear Tire & Rubber Co. The gigantic belt conveyor system will haul raw materials for building the $58,000,000 Bull Shoals Dam on the White River in Marion and Baxter counties, Arkansas. Weighing approximately 360 tons, the series of main haul belts will utilize 250,000 pounds of cotton fabric and 470,000 pounds of compounded rubber. In addition to the main haul system, Goodyear will supply 14,000 feet of belt for the pit gathering and final classification operations.

McCOLM ADDRESSES ONTARIO ON NATURAL RUBBER LATICES

The Ontario Rubber Section of the Chemical Institute of Canada held a dinner and meeting on January 20 at the University of Toronto, in Toronto, Ontario, Canada. Dr. E. M. McColm, Technical Director of the Plantation Division of the United States Rubber Company, addressed the assembled members and guests on "Present Techniques and Future Possibilities in the Preparation of Natural Rubber Latices." Methods of improving natural rubber must be discovered without delay if this product is to maintain its superiority over man-made rubber, he said.

Reviewing recent improvements in the synthetic product, Dr. McColm said that a considerable amount of fundamental work must be done in a reasonably short time if the natural rubber producers are to stay in business. The speaker added that synthetic rubber has already equalled natural in a number of important aspects and now threatens to pull abreast of it in other properties. If past competition between natural and synthetic products is any guide, he said, the natural product can only retain its superiority by continued improvement.

The synthetic rubber people regularly supply dry rubbers and latex of stated plasticity. The same shall have to be done for natural rubber, he stated. A new low-temperature synthetic shows some evidence of improved abrasion resistance over natural rubber, and if this is confirmed in tire tests, it may displace natural rubber for this use, Dr. McColm observed.

The speaker cautioned rubber chemists against the attitude that nothing can be done to improve natural rubber and hoped for further advancements in this field. He suggested possible methods of controlling the softness of raw rubber and improving its durability by techniques of continuing the rubber tree's chemical reaction in the factory.

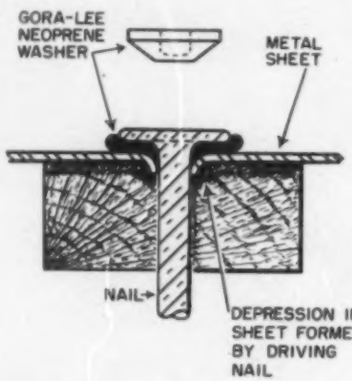
The speaker pointed out that the synthetic rubber industry is spending more than one per cent of its total sales income on research, whereas the Malayan natural rubber research budget is less than four-tenths of one per cent of sales. He concluded that larger appropriations for research will be necessary to keep natural rubber competitive with its man-made counterpart.

Elect California Group Officers

The recent letter ballot conducted by the Northern California Rubber Group has resulted in the following officers for the 1948 season: *President,* Ross E. Morris (Mare Island Naval Shipyard); *Vice-President,* Edward P. Coxhead (Pioneer Rubber Mills); *Secretary,* Victor Sagues (Plant Rubber & Asbestos); *Treasurer,* Neil McIntyre (Oliver Tire & Rubber). Three directors were also elected, as follows: Fred Swain (Pioneer Rubber Mills), Robert Henderson (American Rubber), and Russell Kettering (Oliver Tire & Rubber). George B. Farwell (Goodyear Rubber), the retiring chairman, also acts as a director.

Nails with Neoprene Washers

Several nail manufacturers are currently offering umbrella-head, screw-type and straight nails with special neoprene washers already in position under the head. The washers are produced by the Gora-Lee



Corp., Stratford, Conn. In building and construction work the principal attributes of the special nails include resilience, even after years of sun, rain and cold; the ability to fill tiny crevices and cracks around nail holes, and the non-metallic washer composition which aids in the elimination of corrosion. By offering the neoprene washers already on the nails, the time losses and clumsiness of manually placing each washer and driving the nail through it is obviated. The development is said to have been made possible by two principal Gora-Lee developments, namely, a special composition and cure for the neoprene compound, and the perfection of high-speed machinery for mating nails and washers at the factory.

25-Year Club Plans Luncheon

A luncheon of the Twenty-Five Year Club of the Division of Rubber Chemistry, A. C. S., will be held on Wednesday, April 21, at the Sherman Hotel in Chicago, Ill., during the Spring Meeting of the Division. The luncheon will enable the "old timers" of the Division to get together and maintain old contacts and friendships. Membership in the club is open to all those who can prove that they have been members of the Division for at least 25 years. In many cases eligibility is up to the individual, because the old membership lists of the Division are not available. Dr. H. A. Winkelmann, research director of the Dryden Rubber Division, Sheller Manufacturing Corp., 1014 So. Kildare Ave., Chicago 24, Ill., is chairman of the Twenty-Five Year Club Committee.

Southern Ohio to Hear Toulmin

Col. H. A. Toulmin, Jr., member of the firm of Toulmin & Toulmin, Patent Counsel, and chairman of the board of the Commonwealth Engineering Corp., will be the principal speaker at the next meeting of the Southern Ohio Rubber Group, to be held on Friday, February 20, at the Engineer's Club in Dayton, Ohio. He will speak on "Making Profits from Patents." The DuPont film, "The Story of Neoprene," will also be shown.

DENMAN TIRE STOCKHOLDERS CONSIDERING REVISED SET-UP

Stockholders of the Denman Tire & Rubber Co., Warren, Ohio, have been asked to approve a plan for retirement of the company's preferred stock and the segregation of its manufacturing and merchandising functions.

In a recent letter to stockholders, William B. McCandless, president, stated that a new company, called the Denman Rubber Manufacturing Co., has been organized, and proposes to purchase production facilities of Denman Tire's present plant in Warren. The new company would produce tires and other rubber products for the present Denman Tire & Rubber Co. and for the H. F. Webster Syndicate.

Mr. Webster, who has been vice-president and general manager of the parent company for many years, will be president of the Denman Rubber Manufacturing Co. He has been instrumental in forming the syndicate which will bring added production to the company's plant at Warren, according to the statement to stockholders.

The parent company will retain a substantial interest in the new company, as well as a first mortgage on the plant and will have certain priorities on the plant's production. No major changes in officers or directors is planned for the parent company. On approval of the stockholders the sales office will be moved from Warren to New York City.

Stockholders were advised that the proposed plan would give the manufacturing company a greater production potential and should result in greater efficiency in cost as well as a more stable production through the unseasonal months in the tire business. Incorporation papers were recently filed in Columbus, Ohio, by the Denman Manufacturing Co., listing incorporators as John D. Simpson, Robert W. Sharp and H. Hall Kellogg. The new company is incorporated at $301,000.

California Group Hears Milward

A talk on "Developments in Mill Safety Appliances" by John Milward, sales manager of William R. Thropp & Sons Co., Trenton, N. J., featured the first regular meeting of the new year of the Northern California Rubber Group, held on January 29 at the Claremont Hotel in Berkeley, Calif. Approximately 50 members and guests were present, and the speaker's talk was well received. Mr. Milward was also scheduled to make the same address before the Los Angeles Rubber Group.

Detroit to Hear Dr. McColm

Dr. E. F. McColm, of the Plantations Division of the U. S. Rubber Co., will be the principal speaker at the next meeting of the Detroit Rubber & Plastics Group, to be held in Detroit on Friday, February 20. Dr. McColm will discuss "Political and Economic Problems of the Rubber Producing Areas of the Far East." He will also discuss some of the present techniques and possibilities in natural rubber latex.

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THE FLEXIBLE COUPLING shown above is a mighty important item on the 4800 horsepower Pratt & Whitney engines used in the new Convair-Liner commercial transports.

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PERBUNAN NITRILE RUBBER was selected for this vital coupling after engineers of Consolidated Vultee and the technicians of Los Angeles Standard Rubber, Inc. ran many exhaustive tests and found Perbunan best suited for the job.

For rubber that resists oil, heat, abrasion and water... holds delicate colors... and stays flexible at low temperatures... write our nearest office.

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LOS ANGELES NEWS

The Los Angeles Rubber Group met on February 3, at the Hotel Mayfair, in Los Angeles. John Milward, sales manager of William R. Thropp & Sons Co., spoke on "Developments in Mill Safety Appliances," at the technical meeting preceding the dinner party. The development of safety features for in-running rolls as applied to mills and calenders for rubber and plastics was discussed by Mr. Milward.

It is generally considered by those who write the National and State Labor Codes that there are two main problems involved, stated the speaker. One applies to the prevention of an operator from being caught in the bite of the rolls; the other towards providing for emergency stopping of the rolls in the event the operator does get caught.

Codes specify stopping distances on a 22-inch mill in 15 seconds. Since a 22-inch roll at 24 r.p.m. travels 27½ inches per second, there is less than one second in which to stop the mill. Thus, every refinement in safety equipment must be reviewed in terms of fractions of a second in order to properly evaluate its worth, said Mr. Milward.

The recent discussions of the Code Committees, with regard to reducing the permissible stopping distances, has caused the electrical motor manufacturers to consider design changes in motors to the higher currents and deceleration forces that will be necessary with electrical braking, he noted.

According to the speaker, the new type Thropp mechanical brake seems to be the only presently known solution to effecting the shortest stopping distances. This is an internal expanding-type brake with a spring-loading device which will stop a mill or calender in from one-third to one-half the time permitted by the National Safety Code. For example, it will stop a 22-inch mill operating at 24 r.p.m. on the back roll in 4 inches rather than the 15 inches specified by the code.

Development of the new Thropp brake, stated Mr. Milward, resulted from a study of the old type external contracting drum-type brake, which was loaded by a weighted lever. The arm showed that almost two-thirds of the time allowed to stop a mill was used up in applying the load to the brake. Mr. Milward showed a series of graphs depicting the relative stopping distances effected by various types of brakes.

The after-dinner meeting of the group featured a talk by Will Rogers, Jr., on "American Leadership in Europe." Having recently returned from an extensive trip abroad, Mr. Rogers was well qualified to discuss the subject and his interesting talk was well received. Several committee reports were made at the meeting.

Acquisition of the S. T. Dahl Co. of Los Angeles, along with its personnel, has been announced by the American Cyanamid Co. Sheldon T. Dahl, who headed up the company bearing his name, has been appointed West Coast sales manager for the industrial chemicals and plastics divisions of American Cyanamid. An office and warehouse have been opened at 2472 East 8th St., Los Angeles 21, Calif.

The Fifth Annual Meeting of the Pacific Coast Section of the Society of the Plastics Industry will be held at the Biltmore Hotel in Santa Barbara, Calif., on March 28, 29 and 30. The first day of the meeting will be devoted to registration only, with no official event scheduled. The second and third days will be filled with general meetings, technical discussions, entertainment and ceremonies, climaxing with a banquet on the evening of March 30. Herb Pratt, of the American Cyanamid and Chemical Co., is General Conference Chairman.

William J. "Bill" Haney, formerly factory manager of the Kirkhill Rubber Co., has been promoted to general manager of that firm. Willys Blount has been named factory manager.

W. D. Voit, H. P. Parker, Mel Barton and Woody Lawless, all of the W. J. Voit Rubber Corp., attended the annual convention of the National Sporting Goods Association held in New York City early this month.

Several members of the local plant of the Goodyear Tire & Rubber Co. were recently transferred to other locations. Bob Torian was assigned to a new post at the New Toronto, Canada, plant. Dick Bell joined the tire design department at Akron. Dave Shepherd left for Lima, Peru, where he will take over the job of chief chemist.

William A. Gute, associated with the A. Schrader's Son Division of Scoville Manufacturing Co. for the past 25 years, largely at the Brooklyn, N. Y., headquarters, has joined the Los Angeles office as office manager.

Tonnie A. Hoyle, formerly associated with the B. F. Goodrich Chemical Co. at the Cleveland, Ohio, general offices, has joined Ray Bitter at the local sales office.

R. E. "Hutch" Hutchinson (Firestone) is back at his job after a long siege of illness.

Herman Libkind (Western Insulated Wire) was kept busy recently handing out cigars on the occasion of the birth of his second son.

This correspondent of RUBBER AGE wishes to extend his thanks to Phil Drew (Goodyear) and E. McLaughlin (H. M. Royal) for their excellent cooperation in helping him gather news of the local rubber industry.

Past chairmen of the Los Angeles Rubber Group are pictured above. TOP ROW: Al Pickard (Braun Corp.), Ed Royal (H. M. Royal), C. M. Reinke (Reinke & Amende), and Curtis Wolter (Witco Chemical). BOTTOM ROW: Charles J. Roese (Goodyear) and William R. Hucks. The 1948 chairman is Phil Drew (Goodyear).

TALES WORTH RETELLING

(No. 1 of a series)

"BLOW HOT...BLOW COLD"

THIS is a story of the Man who lost his way in the woods one bitter winter night. A peasant found him and lead him to his cottage. On the way, the Man often raised both hands to his mouth and blew on them.

"What do you do that for?" asked the peasant.

"My hands are numb with cold and my breath warms them," said the Man.

Soon they arrived at the peasant's home where he put a smoking hot dish of porridge before them. When the Man raised his spoon to his mouth, he began blowing on it.

"And what do you do that for?" asked the peasant.

"The porridge is too hot, and my breath will cool it."

"Then get out of my house!" said the peasant, "I'll have nothing to do with a man who can blow hot and cold with the same breath."

★ ★ ★

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CANADIAN NEWS

The annual conference of the Chemical Institute of Canada will be held from June 7 to 10 in Montreal. Headquarters will be the Mount Royal Hotel. The Rubber Division is planning a technical session at the conference, details of which will be announced in the near future. The Division is inviting papers from Canadian rubber and plastics technologists for presentation at the planned session, and authors desiring to present such papers should so inform J. T. Black, secretary-treasurer of the Division, by March 1, submitting the title, an abstract of 100 words, a 500-word outline of the paper, and a short personal biography. The papers should be based on original work, although review papers will be given consideration. Mr. Black can be reached at the Polymer Corporation, Sarnia, Ontario.

According to word received from Sarnia, total GR-S production by the Polymer Corporation at Sarnia for the calendar year of 1947, to the nearest 100,000 pounds, amounted to 79,000,000 pounds, while total production of butyl rubber, to the nearest 100,000 pounds, was 16,000,000 pounds.

It has just been learned that on December 18 Polymer Corporation, Ltd., advised all Canadian rubber manufacturers that sharp increases in costs necessitated higher prices for both Buna S and Butyl. Since January 1 the new price is 19c per pound delivered for both types of synthetic rubber. However, it was also stated that sales of Buna S are subject to a rebate of ½-cent a pound if total Canadian consumption exceeds 3,500,000 pounds per month or to one of 1 cent per pound if consumption exceeds 3,800,000 pounds per month.

A modest decline in production is anticipated in Canadian rubber manufacturing circles. Trade inventories, it is reported, have been built up to normal. Canadian manufacturers expect sharper competition both at home and in Empire markets from the U. S. industry. The early operation of the Marshall Plan might defer this considerably. While the Canadian rubber industry gains some trade advantages with several foreign countries under Geneva, it also loses a margin of its Empire preferences with Empire countries.

Stocks of natural rubber in Canada contracted to 5,260 long tons in November from 7,167 the previous month and reclaim rubber dwindled to 2,093 tons from 2,440, but synthetic rubber stretched to 3,846 from 3,475 long tons. Domestic production of synthetic decreased to 2,953 tons from 3,034 in October, 1947, and reclaim to 372 from 424 tons.

Consumption of natural and synthetic rubber decreased, natural dropping to 3,216 tons from 3,330 and synthetic to 1,962 from 2,000, while consumption of reclaim rubber increased to 1,417 from 1,397.

Alan S. Canavan was recently appointed Montreal representative for the "Mechanical" Department of the Miner Rubber Company Ltd., replacing Ward Buzzell who has been transferred to their Toronto Branch. Mr. Canavan was educated at Lower Canada College, and has over four years' active service with the Seventeenth Hussars to his credit. He served for some time with the Intelligence Section in France and Germany. He will be calling on shoe manufacturers, waterproof clothing wholesalers and the garment trade.

According to trade rumors, the voluntary restrictions on the use of natural rubber latex which are still being observed in Canada may soon be discontinued.

His Excellency Viscount Alexander, Governor-General of Canada, was a recent visitor to the New Toronto, Ontario, plant of the Goodyear Tire & Rubber Co. of Canada, Ltd. He was conducted on a two-hour tour of the plant, including the new Airfoam and Pliofilm departments.

Goodrich has announced that Koroseal is now available in the form of an elastic masking tape, able to withstand such strong oxidizing agents as chromic, nitro and sulfuric acid. The tape is of .005-inch thickness, and comes in four widths, from ¼ to 36 inches.

A 50-cent golf ball, under the name of the U. S. Nobby, has been introduced by U. S. Rubber. Although it will not fly as far as top-grade golf balls, it has an exceptionally tough cover to withstand abuse.

A 12-page catalog section on the industrial protective clothing it markets has been issued by Goodrich. Pictured and described are both rubber and Koroseal garments, including industrial raincoats, acid-proof aprons, sleeve protectors, and work suits.

Deeply sculptured designs in flexible vinyl plastic sheeting were recently made available to the handbag, luggage, shoe and other trades by the Vintex Corporation of America, New York City. Called Vintex Plasti-Cast, the new material is both scuff-proof and waterproof, and comes in 36-inch widths.

Firestone recently announced that the manufacture, distribution and servicing of its aircraft wheels and brakes have been assigned to the Hydra-Control Co. of Pasadena, Calif. The latter will take over all unfilled orders and will continue to supply and service former Firestone customers.

Glass Cord Steam Hose

A new glass cord steam hose, which will carry saturated steam at a temperature of 388° F. at a pressure of 200 pounds, has been announced by the Goodyear Tire &

Rubber Co. A joint development of Goodyear and the Owens-Corning Fiberglas Corp., the hose utilizes Fiberglas cords which are only 25/1000 of an inch in diameter and result in a wall only 9/32 of an inch in thickness. The cords are coated with rubber. A special braiding machine is used in the manufacture of the new hose. Illustrated herewith, the braider is essentially a great steel circle, 6 feet 6 inches in diameter, set on its side. There are 48 carriers around the rim of the circle, each carrying along a Fiberglas cord.

DuPont Opens N. Y. Office

Because of expanding business in the New York area and to give quicker and better service to its customers, the Rubber Chemicals Division of DuPont's Organic Chemicals Department has opened an office at 40 Worth St., New York 13, N. Y. Invoicing of orders and other services will be handled from this office for New York City, New York State, Connecticut and northern New Jersey. The office will be the headquarters of P. P. Murawski, J. P. Fuller and H. W. Day. Manager of the Organic Chemicals Department office at 40 Worth St. is S. M. Conn.

Eagle Rib Motorcycle Tire

A new motorcycle tire, designated the Eagle Rib, size 3.25-19, was recently announced by the Goodyear Tire & Rubber Co. as the latest addition to the firm's motorcycle tire line. The tire is now being manufactured in 2-ply construction for the Harley-Davidson light-weight unit, model 125, a new vehicle currently in production by that concern. The tire is used as original equipment on the new unit. The new tire is also made with four plies to equip heavier-type motorcycles. It fits many of the English imported motorcycles as well as the new Harley-Davidson model.

The 1947 RUBBER RED BOOK is now available. Price: $5.00.

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Newest addition to the literature published for you by the Witco Technical Service Laboratory is a 32-page bulletin, "Witco Pigments In Rubber." Write for your copy.

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DC MOLD RELEASE EMULSION NO. 35

increases efficiency in molding mechanical rubber goods

PHOTO COURTESY BALDWIN RUBBER CO.

Automotive grommets of synthetic rubber are easily unloaded in a single sheet from 121 cavity mold lubricated with DC Mold Release Emulsion No. 35.

When the production manager and the press operator agree on the merits of a mold lubricant it's good news in the rubber industry. Ordinary mold lubricants which give easy release and win favor with the operator break down fast at molding temperatures and run up a whale of a bill for mold maintenance. But DC Mold Release Emulsion No. 35 is not an ordinary mold lubricant. It's one of those remarkably heat-stable Dow Corning Silicone Products. Chemically related to glass and quartz, this DC Silicone mold lubricant gives easy, clean release and still keeps molds cleaner for a much longer time than any other release agent.

You will note in the picture above, the clean, bright finish which results from rapid flow into a clean cavity. That means more salable rubber goods.

You will note also that this sheet of 121 automotive grommets unloads easily. That saves change time and speeds up the molding cycle, lessens the danger of tearing molded parts, simplifies the job of trimming and finishing.

DC Mold Release Emulsion No. 35 is clean, efficient, and pleasant to use. It is effective in very low concentrations and can be applied rapidly. In many molding jobs, only a few applications are required per day. You can't beat that combination of clean and easy release, high surface finish and clean molds that stay clean.

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Los Angeles: 1514 S. Hope St. • New York: Empire State Building
Canada: Fiberglas Canada, Ltd., Toronto • England: Albright and Wilson, Ltd., London

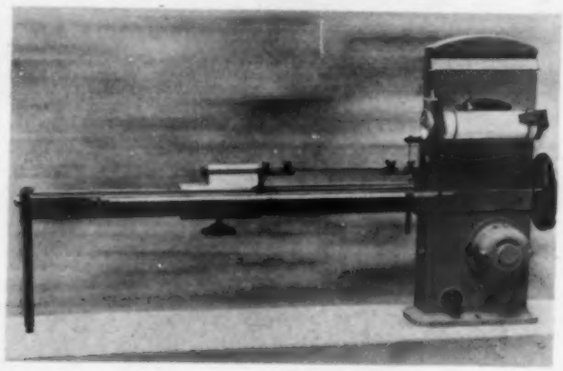
FOR MORE INFORMATION ABOUT DC MOLD RELEASE EMULSION NO. 35, PHONE OUR NEAREST BRANCH OFFICE OR WRITE FOR LEAFLET NO. V 5-2.

Dow Corning
FIRST IN SILICONES

NEW EQUIPMENT

Amsler Tensile Testing Machine

The firm of Adolph I. Buehler, 228 No. LaSalle St., Chicago 1, Ill., was recently appointed general agent for the United States and Canada of the internationally known line of Amsler testing machines. Among these devices is the Amsler Horizontal Tensile Testing



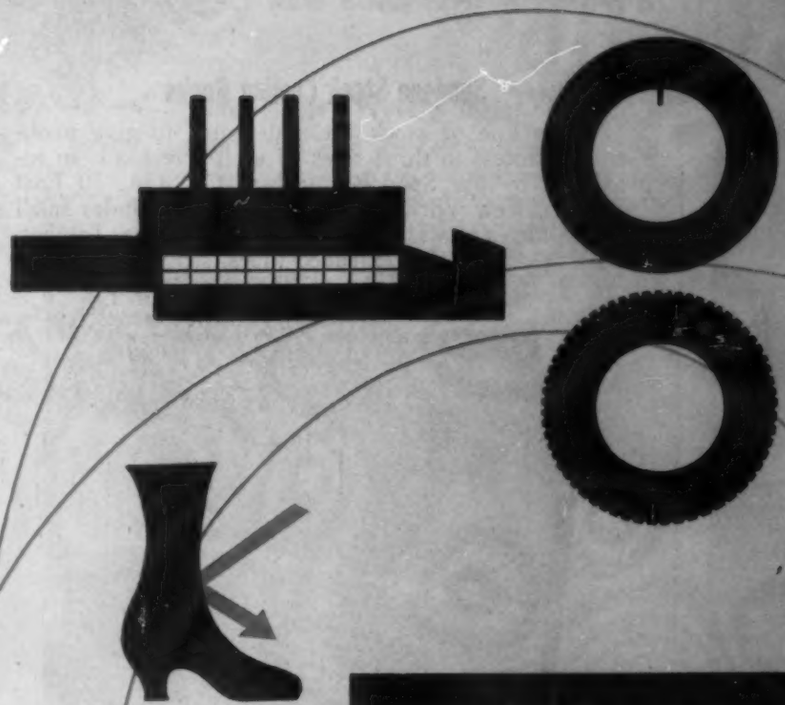
Machine, which is designed for testing materials of small section or low tensile strength such as fabrics, papers, yarn, leather and fine wires. It is said to be particularly suitable for testing specimens having a great elongation, such as rubber.

Universally applicable, the Amsler tensile tester includes all the features desirable in a small testing machine, such as a pendulum load weighing system which guarantees accuracy, five load ranges permitting widest application, easy access and unobstructed view of the specimen, convenient gripping mechanism, and an easily visible indicator and automatic load-extension diagram recorder.

The stress is applied by means of a screw which moves the pulling specimen holder away from the fixed specimen holder which is attached to the weighing, indicating and recording mechanism. The motor drive mechanism has eight speeds, from 0.1 to 20 inches per minute. The tensile load applied is balanced by the deviation of the pendulum from the vertical position. The movement of the pendulum is indicated on a straight line scale. The pointer remains at the maximum load after fracture. The elongation can be determined by a scale at the side of the machine or by the record diagram which may be either full size or double size.

Di-Acro Notching Unit

The Di-Acro Notcher, a sturdy, flexible, precision shearing unit which will rapidly and accurately cut notches in sheet materials, including rubber specimens, has been added to the line of Die-Less duplicating equipment featured by the O'Neil-Irwin Manufacturing Co., Lake City, Minn. According to the manufacturers, a 90 degree notch of any size, within the capacity of the machine, can be accurately cut in one operation either at the corner or in any position along the edge of a sheet. A flexible gauging arrangement built into the unit allows a notch of any dimensions desired to be exactingly located providing precision in all duplicated parts.



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factory tested

Cabot Sterling S O is factory tested for a variety of applications — in tires and tubes, footwear, mechanical goods, cable jackets, in extruded goods of all kinds. Cabot Sterling S O is a Smooth-Out Furnace type carbon black which gives excellent results in any stock calling for a smooth, glossy appearance. It assures good extrusion, without sacrifice of physical properties. Sterling S O is available now, in carload quantities.

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Weathering qualities of
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determined with reliable
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ATLAS *twin arc*
WEATHER-OMETER

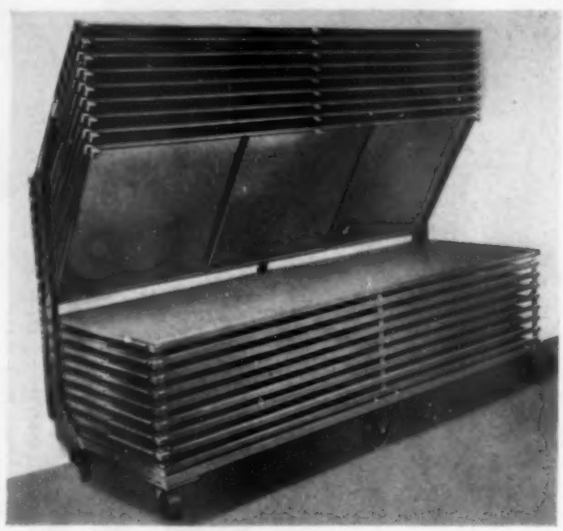
Any selected cycle of exposure to sunlight and wetting can be set for automatic continuous testing in the Weather-Ometer. Exact tests can be duplicated at any time by settings on the control panel which contains temperature regulator—time meter—light and water cycle switch — automatic cut-off switch — voltage adjusting switch — direct reading thermal regulator — reactance coil (for economical current consumption). The Weather-Ometer is fully automatic in operation; can be left unattended over night; only necessary to renew carbons once in 24 hours. Years of exposure to any conditions of weathering reduced to a few days testing in the laboratory with the Weather-Ometer.

Originators and sole manufacturers of accelerated testing machines for over a quarter of a century. Fade-Ometer, Weather-Ometer, Launder-Ometer — the accepted standard testing machines used all over the world.

ATLAS ELECTRIC DEVICES CO.
361 West Superior Street, Chicago 10, Illinois

Spadone Stock Cooling Racks

A new line of stock racks designed to give unobstructed access to three sides of each tray has been introduced by the Spadone Machine Co., Inc., 10 East 43rd St., New York 17, N. Y. The line includes small racks which are widely used for milled rubber batches, and larger racks for extruded tubes, strips and similar



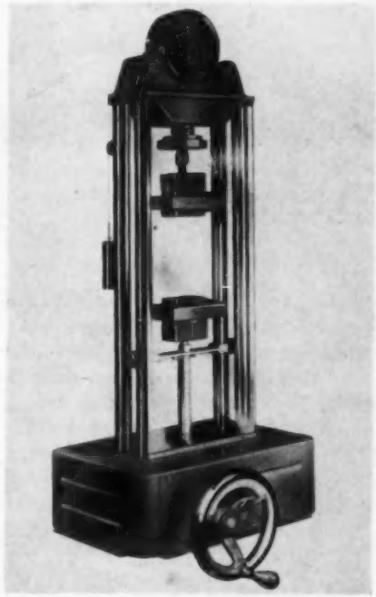
materials. Each tray on the new racks is held in the elevated position by two coil springs, permitting the tray to be raised or lowered quickly and freely without locking devices of any kind. The smaller trays, with either plain or perforated surface, are of one-piece construction with a double folded edge all around and reinforced with welded corner pieces and sturdy front legs. The larger trays are furnished in plain surface only, and are made in two or more sections securely welded together to form strong rigid units. The racks can be supplied in various standard dimensions.

Method of Sharpening Cutting Dies

A unique method of sharpening and re-sharpening cutting dies was recently reported to the Milwaukee Chaplet and Manufacturing Co., Milwaukee 4, Wisc., manufacturers of the Milwaukee Profile Grinder (illustrated herewith). This is a bench-type grinder ordinarily used in tool die and machine shops. It has a vertical spindle on which mounted grinding wheels from ⅛ inch to 1½ inches are used. The spindle revolves at 20,000 r.p.m. and reciprocates vertically 100 times per minute. The incident in question was the adaptation of the grinder to sharpening of leather cutting dies for shoe leather. Only one change was necessary in the machine to adapt it for this purpose and that was in the mechanism which tilts the work table. Ordinarily this table tilts 15 degrees in any direction, but for die sharpening this angle of tilt had to be increased to 32 degrees. The manufacturer in question was able to make this change at very little extra cost. The Milwaukee concern believes the method can be utilized by other manufacturers, including rubber fabricators, who have similar die-sharpening problems.

Dillon Model L Physical Tester

Testing longer specimens, as well as specimens that show considerable stretch, is one improvement effected by the new Model L Physical Tester recently introduced by W. C. Dillon & Co., Inc., 5410 W. Harrison St., Chicago 44, Ill. This has been accomplished by lengthening the uprights to give a 13 inch spread between grips.



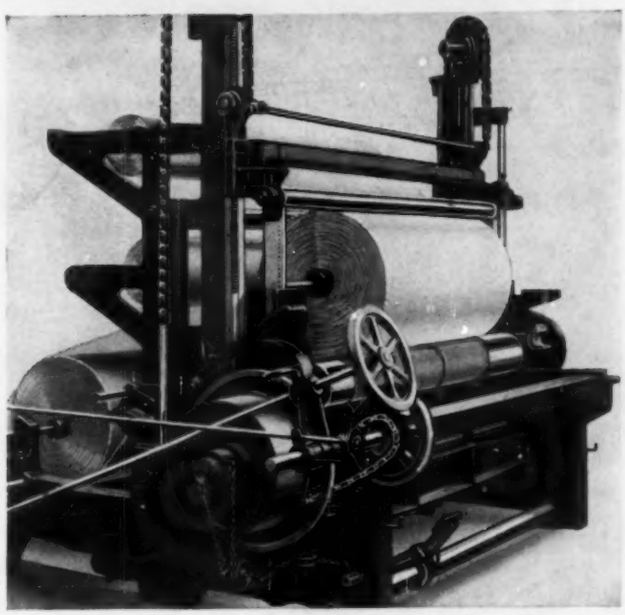
A keyless power screw, which is prevented from turning by means of a special, ball bearing-held yoke, permits exceptionally smooth operation, adds to life of main drive gear. Additional features are the hardened steel sleeve to guide power screw, cast aluminum gear housing, ball bearing power shaft supports, and an improved shock absorber screw. Grips are quickly interchanged to handle tensile, transverse, compression, or shear tests. The Model L is available in 7 ranges: 0-25 lbs., 0-500 lbs., 0-1,000 lbs. 0-2,500 lbs., 0-7,500 lbs., and 0-10,000 lbs. It is supplied complete with gripping jaws and gauge. Operation is manual, with motorization optional.

FOR HIGH ABRASION FURNACE ... PHILBLACK O

FOR FURTHER DETAILS, SEE AD ON PAGE 488

Camachine 10-20

for men with IDEAS!



CAMACHINE 10-20 is a mighty useful machine to have in a rubber plant. It's a fast, heavy duty slitter and rollwinder, and its outstanding quality is *versatility*. The 10-20 produces top quality rewound rolls from webs of all types of plain and friction coated fabrics, paper, rubber and synthetic rubber, from thin gutta-percha tape to heavy brake lining. It can be adapted to cut and wind strip as narrow as ½". It winds tacky rolls alternately on separate rewind shafts, for positive roll separation. It inserts liner cloth in rewound rolls, or rewinds liner from the original roll. It handles web up to 72" wide, and produces top quality rewound rolls up to 36" in diameter. Obviously a machine for men with practical ideas about increased production, improved quality and lower costs. Built by

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Camachines

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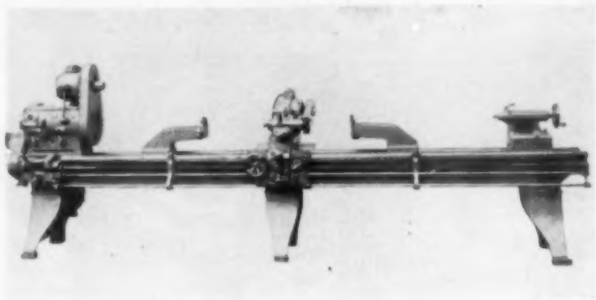
Rubber Roller Polishing Machine

A new type of rubber roller polishing machine, which cleans and polishes rollers on a production basis, has been introduced by the R. K. LeBlond Machine Tool Co., Cincinnati 8, Ohio. The machine is actually the company's regular 19-inch Regal lathe with special



turning facilities for grinding, buffing and polishing. The special equipment, however, does not in any way prevent the machine from being used for standard engine lathe purposes, thereby making it a dual-purpose unit.

In operation, the roller is seated in special steady rests, turned clockwise by a special 1 h.p. 1800 r.p.m. motor on headstock. A 2 h.p. 2325 r.p.m. grinder, located on a special cross slide, runs in the opposite direction. Power from the special motor mounted on the headstock is transmitted to the roller by a direct V-belt drive to the face plate. A special steel driving bar, tipped on both ends with short rubber tubes, takes the power from the face plate to the steel core of the roller. Although the 19-inch Regal (raised) has 150-inch centers, the unit can be furnished in any bed length, depending on the user's special requirements.

The **Ellipse Series C-175 Pump,** which is said to offer positive displacement, high volumetric efficiency and low power requirements due to an entirely new principle in rotary pumps, has been developed by the Ellipse Corp., 24 So. Clinton St., Chicago 6, Ill. The standard pump will handle lubricating oils, hydraulic oils, kerosene, fuel oils, coolants, etc., with capacities from ½ to 4 gallons per minute at 125 psi working pressure.

H. K. Porter, Inc., Somerville, Mass., has improved and redesigned its line of **hand power cutters.** Among the improvements are curved toe-handles which decrease armspread and wrist bend, metal safety handle stop, jaws plainly marked showing capacity and type of metal safety cut, and 30 percent greater tool strength in sections and handles. The Porter cutters can be used for cutting tire beads.

Clean, fast erasings can be made on all types of drawing paper with a new **electrically-driven hand eraser** recently introduced by the Chicago Wheel & Manufacturing Co., 1101 W. Monroe St., Chicago 7, Ill., manufacturers of the well-known "Handee" tool. The unit weighs only 12 ounces, utilizes a rubber eraser and is balanced and shaped to fit the hand.

REVIEWS

BOOKS

Annual Report on the Progress of Rubber Technology: 1946. Published by the Institution of the Rubber Industry, 12 Whitehall, London, S.W. 1, England. 7¼ x 9½ in. 132 pp. Prices: To Members, 4/6 (approximately $1.25); to Non-Members, 12/6 (approximately $3.00).

This latest annual report, the tenth to be issued, covers developments in all branches of the rubber industry during 1946. As usual, reports on developments in the period covered are contributed by experts in the respective fields. The same subjects as those contained in the previous issue (RUBBER AGE, March, 1947) are continued, but several changes have occurred in authorship. Among the subjects covered are planting and production, chemistry and physics, synthetic rubber, compounding ingredients, testing equipment, fibres and fabrics, chemical and physical properties of vulcanized rubber, and various rubber products, including tires, belting, hose and tubing, wire and cable, mechanical goods, flooring, surgical goods, cellular rubber and hard rubber. The current edition is again edited by Dr. T. J. Drakeley and includes a subject index.

•

The Management Leader's Manual. Edited by James O. Rice and M. J. Dooher. Published by the American Management Association, 330 West 42nd St., New York 18, N. Y. 5½ x 8¼ in. 190 pp. $3.00.

Intended for operating executives, supervisors and foremen, this is the first of a planned series of handbooks on the improvement of individual and group relationships in the nation's business structure, jointly written by business, scholastic and government authorities on personnel management and industrial relations. Various sections deal with the management leader's human relations responsibilities, management leadership in a democracy, interviewing and counselling techniques, and means of diagnosing organization problems. Also included is a section of tests to determine the qualifications for management leadership. Quantity discounts are available to concerns desiring to use the manual for training purposes.

•

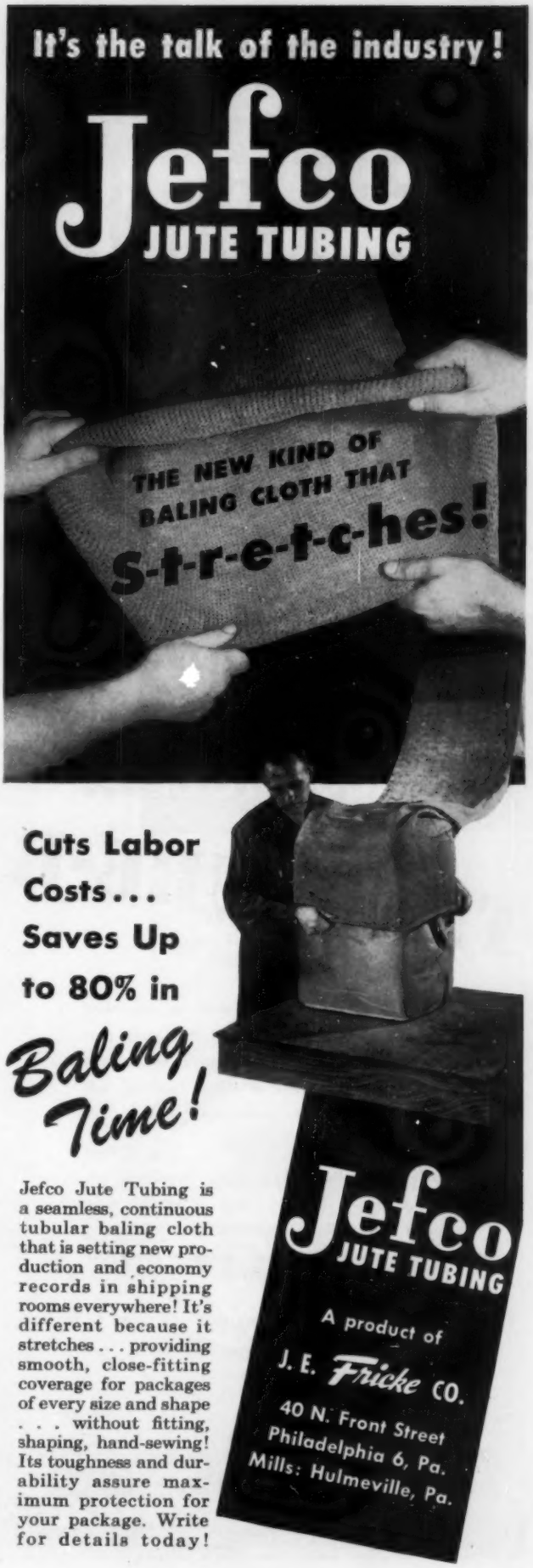
Latex Preservation, Concentration and Shipment. (Planting Manual No. 4, Second Edition.) By J. H. Pidford. Published by the Rubber Research Institute of Malaya, Kuala Lumpur, F.M.S. 6 x 10 in. 76 pp. $2.00.

Planting Manual No. 4, entitled "Latex Preservation and Shipment," was originally issued by the Rubber Research Institute of Malaya in 1932. Since that time a number of papers dealing with special aspects or parts of this subject have appeared, and accordingly this revised or second edition of the manual was prepared. It is comprehensive in the coverage of the subject, with sections devoted to preservation and bulking of field latex, concentration with centrifugal machines and by creaming and other methods, preservatives, packing and shipping, quality standards, and testing. A list of the patents relating to latex preservation and concentration is included.

•

Modern Management Practices and Problems. American Management Association, 330 West 42nd St., New York 18, N. Y. 6 x 9 in. 48 pp. $1.00.

Published as part of the A.M.A. general management series, this latest booklet represents a review of current policies, practices and problems in seven fields of business and industrial management, namely, production, distribution, finance and economic planning, labor relations and personnel administration, office management and administration, insurance, and packaging and merchandising. Separate reviews on each of these subjects are included.



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REVIEWS (CONT'D)

The Science of Plastics. Vol. I. Edited by H. Mark and E. S. Proskauer. Published by Interscience Publishers, Inc., 215 Fourth Ave., New York 3, N. Y. 6½ x 9¾ in. 632 pp. $9.00.

With the aim of furnishing comprehensive abstracts of the more important published literature, Interscience Publishers introduced an abstract service on "Resins, Rubbers, Plastics" in 1942. This service is still being offered to industry. It was believed that a systematic collection of these abstracts covering a definite period of time with an extensive subject index would prove of value, and accordingly this book has been issued. Representing reproductions of the original abstracts, the book covers the literature on plastics in the 1942-46 period.

The abstracts are grouped together like chapters of a book. The present volume is divided into four chapters: (1) Properties and Evaluation of Plastics; (2) Physical Chemistry of Polymer Systems; (3) Kinetics of Polymerization Reactions; (4) Plastics Engineering. Abstracts in the current volume are of papers treating of more than one plastic substance. Papers restricted to studies on single plastics will be covered in Volume II, now under preparation.

BOOKLETS, CATALOGS, etc.

Today's Furnace Blacks. By Isaac Drogin and Hester R. Bishop. Issued by the United Carbon Co., Inc., Charleston, West Virginia. 8½ x 11 in. 170 pp.

Timely and topical, this review of present-day furnace blacks is a welcome addition to the technical literature. Because of conditions created by the partial transition from GR-S to natural rubber, and because the manufacture of carbon black is now about equally divided between furnace and channel types, a review of current applications of the furnace blacks and a discussion of their future possibilities should prove of value to every compounder. The work is virtually a monograph on furnace blacks, since it covers manufacture, classification, relative statistics, physical and chemical properties, evaluation in natural and synthetic rubber, accelerator reduction, blends, effect of increased black loadings, effect of various accelerators, behavior of different blacks in natural and various synthetic rubbers, and industrial applications. Patent, name and subject indexes are included.

•

Rubber Science and Technology. By A. van Rossem. Issued by the Netherlands Chemical Society, Sarphatikade 12, Amsterdam, Holland. 6¼ x 9½ in. 38 pp.

Issued as Part IX of "Chemistry in Wartime in the Netherlands," a review of the scientific work done by Dutch chemists in the 1940-45 period, the current report covers rubber science and technology. The nature of investigations carried out during the war years by the two Dutch Institutes concerned with rubber—the Netherlands Government Rubber Institute (Rubber Research Institute T.N.O.) and the Rubber Foundation—is discussed. This work covered latex, raw rubber, synthetic rubber-like materials, vulcanization, the properties of vulcanized rubber, and analysis and testing. The results of many of the investigations were published at the time or have since been published, and a list of literature references is included.

•

Wonder Book of Rubber. B. F. Goodrich Co., Akron, Ohio. 7 x 10 in. 36 pp.

A new version of Goodrich's well-known "Wonder Book of Rubber," which is intended for distribution to laymen, particularly public and high school students, the present edition has been made up in the popular comic strip fashion. The multicolored booklet traces the history of rubber, the development of the rubber manufacturing industry, and the manufacture of some of the better known rubber products, including tires. The important position occupied in the industry by the Goodrich company is emphasized throughout the booklet.

Insulation and Jacket Compounds for Wire and Cable. (Report No. 47-6.) By R. S. Griffin and J. P. Fuller. Rubber Chemicals Division, E. I. du Pont de Nemours & Co., Wilmington 98, Delaware. 6¼ x 9½ in. 28 pp.

Various compounds of neoprene and GR-S to be used as insulations and jackets in various types of wire and cable are furnished in this technical report. Recommendations are made for compounds to meet the specifications of both A.S.T.M. and Underwriters' Laboratories. The physical properties of all compounds are tabulated with the specification requirements. Many of the compounds shown were designed to cure in 12 to 30 seconds at 200 psi steam pressure in order to meet the exacting requirements of continuous vulcanization equipment. For this reason it is believed the accelerator recommendations will be of interest to many branches of the rubber industry where the trend is toward shorter cure cycles at higher temperatures.

•

Processing Natural Rubber and Synthetic Polymers. Sun Oil Co., 1608 Walnut St., Philadelphia 3, Penna. 8½ x 11 in. 40 pp.

This booklet performs a triple function in that it includes a brief history of the synthetic rubber industry in the United States together with a description of the development, properties and uses of the better known synthetics; lists and describes the company's processing aids, including Circo Light Process Oil, Circosol-2XH, Sundex-53, Circomar-5AA, and Sunaptic Acid-130; and contains data and formulas involving the use of Sun products in rubber processing and compounding. Among the formulas are natural rubber compounds for insulated wire, natural rubber sponge compounds, GR-S tire stocks, and GR-S heavy footwear stocks. A section is also devoted to a number of neoprene stocks. Physical test data is shown in all cases.

•

Thiokol Synthetic Rubber Type PR-1. Thiokol Corporation, 780 No. Clinton Ave., Trenton 7, N. J. 9 x 12 in. 6 pp.

General information on the properties, compounding, and mixing and curing of Thiokol Type PR-1, a relatively new polysulfide rubber with a specific gravity of 1.33 with unusual resistance to solvents, is included in this report. Several typical compounds are shown, with physical properties indicated. The percentage volume swell of a typical 70 Durometer PR-1 stock, after one month's immersion at room temperature, is shown for some 24 different solvents. Thiokol PR-1 stocks, according to the report, can be used in a temperature range of —60° F. to 212° F.

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FOR FURTHER DETAILS, SEE AD ON PAGE 488

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REVIEWS (CONT'D)

Bulk Handling of Carbon Black. By B. A. Wilkes and S. V. Stoddard. Godfrey L. Cabot Co., Inc., 77 Franklin St., Boston 10, Mass. 8½ x 11 in. 24 pp.

Some of the fundamental facts relating to the bulk handling of carbon black are outlined and discussed in this booklet. What the system actually is, how it works, and what its advantages are to the user are some of the questions asked and answered. Each specific piece of required equipment is illustrated and described and schematic drawings are used to amplify the text. Because of recent developments in this field, it is believed that many carbon black users who formerly could not justify the expense of a bulk handling installation because of its limited application may now be in a position to do so.

•

The Use of Perbunan in Vinyl Resins. Enjay Co., Inc., 15 West 51st St., New York 19, N. Y. 8½ x 11 in. 10 pp.

The effect of three separate types of Perbunan—18, 26 NS and 35 NS 90—in vinyl resin compounds is discussed in general in this technical report. Although the work reported covers Perbunan-Vinylite VYNW compounds, the results indicate that the information may be broadly applicable to blends of Perbunan with vinyl chloride and many of its commercially available polymers. Data is furnished on compounding, processing, mixing, extrusion, calendering and molding. Physical properties are shown and discussed. Although issued as a separate report, it is so arranged that it can be bound in the Perbunan Manual.

•

Sharples Synthetic Organic Chemicals. (15th Edition.) Sharples Chemicals Inc., 123 Broad St., Philadelphia 9, Penna. 8½ x 11 in. 68 pp.

Like previous publications, this new edition is designed to bring up-to-date in convenient and useful form information that will assist users in selecting chemicals for application in existing processes or in the development of new ones. This indexed booklet provides information on alcohols, esters, ethers, alkyl chlorides, amines, ureas, amides, dithiocarbamates, phenols, mercaptans, hydrocarbons, and corrosion inhibitors, as well as rubber chemicals. Solubility tables for the different chemicals are included.

•

Control Valves. Sinclair-Collins Valve Co., 454 Morgan Avenue, Akron 11, Ohio. 8½ x 11 in. 20 pp.

Complete with engineering drawings, charts and diagrams, this pamphlet discusses the company's line of control valves. The technical differences between the different types of valves are outlined, while capacity charts indicate the various uses to which they might be put.

FOR HIGH ABRASION FURNACE... PHILBLACK O

FOR FURTHER DETAILS, SEE AD ON PAGE 488

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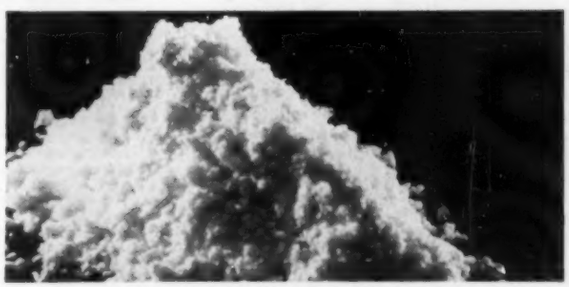

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MARKETS

Rubber – Crude, Reclaimed and Scrap – Cotton – Ducks – Tire Fabrics – Sheetings

NEW YORK, FEB. 10, 1948

Natural Rubber

The price of spot rubber on the Commodity Exchange has moved in the surprisingly narrow range of 1.25 cents since our last report (Januuary 15), high being 21.62 cents on the first day of the period (January 16) and low 20.37 cents today (February 10), the last day of the period. The average price of spot rubber for the month of January was 21.83 cents, based on 21 trading days, which compares wtih the average of 21.45 cents for the previous month.

The state of uncertainty in the market, reflected by the rise and fall of prices, is due to a number of bullish and bearish influences. Among the bullish influences are continued high consumption, the Shafer Bill, government stockpiling, reduced production in Malaya, expanding world consumption, and continued uncertainty over the Dutch East Indies situation, despite the latest negotiations.

On the bearish side are devaluation of the French franc which may be a forerunner to action by other countries, probable expansion of world rubber production, smaller consumption predicted for the second half of the current year, slow-down in business activity usually marked in a Presidential election year, reduced effort on the part of the United States to bolster the Far East, and the gradual easing of restrictions on free rubber trading in producing areas. For example, "free" trading has been resumed in Ceylon for the first time since 1942.

Today's quotations in the outside market, London and Singapore, follow:

Outside Market

No.1 Ribbed Smoked Sheets:	
Spot	.20⅜
June	.19¼
July-September	.19
Thin Latex Crepe:	
Spot	.26½
April-June	.25½
Thin Brown Crepe, No. 2	.16½
Ambers, No. 3	.16½
Flat Bark Crepe	.13⅛

London Market

(Standard Smoked Sheets)

April-June	20.88 - 20.99
July-September	17.83 - 17.94

Singapore Market

(Standard Smoked Sheets)

March	18.99 - 19.20

Synthetic Rubber

(Dry Types)

Butaprene NXM	.470 - .495
Chemigum 30 N4NS	.400 - .470
Chemigum 50 N4NS	.400 - .470
Chemigum N3	.450 - .520
Hycar OR-25	.400 - .425
Hycar OR-15	.470 - .495
Hycar OS-10	.400 - .425
Neoprene Type E	—— - .650
Neoprene Types CG and AC	—— - .500
Neoprene Types FR and KNR	—— - .750
Neoprene Type S	—— - .320
Neoprene Type NC	—— - .250
Perbunan 18	.390 - .415
Perbunan 26	.400 - .425
Perbunan 35	.470 - .495
Thiokol Type A	.370 - .470
Thiokol Type ST	.750 - .850
Thiokol Type FA	.520 - .620
Thiokol PR-1	.750 - .850

Scrap Rubber

The scrap rubber situation continues to improve slightly, but the poor weather conditions which currently prevail are seriously interfering with shipments. A bill introduced by Rep. Walter B. Huber (Dem., Ohio) to lift import taxes on scrap rubber containing synthetic rubber is expected to pass shortly. Previously, scrap rubber was classified as a waste product and was subject to a duty of 7½% ad valorem. Current quotations follow:

(Prices to Consumers, Delivered Akron)

Mixed passenger tires	ton	$12.00
Beadless truck tires	ton	nom.
Mixed truck tires	ton	nom.
Beadless passenger tires	ton	nom.
No. 1 passenger peelings	ton	42.50
No. 1 truck peelings	ton	42.50
No. 2 passenger tubes	lb.	.06
Red passenger tubes	lb.	.06
Black passenger tubes	lb.	.04
Mixed passenger tubes	lb.	.04
No. 2 truck tubes	lb.	nom.
Red truck tubes	lb.	nom.
Black truck tubes	lb.	.04
Buffings	ton	15.00

Reclaimed Rubber

Although a slight falling off in demand for reclaim on the part of a few tire manufacturers is reported, on the whole the demand for reclaimed rubber continues at near-record levels. It is believed that the tire industry is not beginning to level off its production as yet, but in a few cases factory adjustments are being made to meet the newest requirements of the automobile manufacturers. There have been no changes in the price structure since our last report. Current quotations follow:

Tires			
Black, Acid	lb.	.08¾ @	.09¼
Black, Digester	lb.	.08 @	.08½
Peels	lb.	.09 @	.09½
GR-S Whole Tire	lb.	.08½ @	.09
Inner Tubes			
Black	lb.	.12¾ @	.13¼
Red	lb.	.13½ @	.14
GR-S	lb.	.09½ @	.10
Butyl	lb.	.08½ @	.09
Shoe			
Unwashed	lb.	.08¼ @	.08¾

Cotton Tire Fabrics

Although tire manufacturers are still cautious with regard to tire fabric commitments, a number of them have contracted for second quarter deliveries. A falling off in demand is anticipated later in the year, but the market remains tight as of this writing. The export field continues to be hampered by the lack of dollar exchange. There have been no changes in the price structure since our last report. Current quotations follow:

Standard, Peeler, 12/4/2	lb.	.7600
Standard, Peeler, 14/4/2	lb.	.7800
Standard, Peeler, 16/4/3	lb.	.8050
Extra Staple, Peeler, 12/4/2	lb.	.8575
Extra Staple, Peeler, 14/4/2	lb.	.8775
Extra Staple, Peeler, 16/4/3	lb.	.9025

Chafers

14.4 oz. (per sq. yard)	lb.	.7750
9.25 oz. (per sq. yard)	lb.	.7325
11.65 oz. (per sq. yard)	lb.	.7050
8.9 oz. (per sq. yard)	lb.	.7475

Cotton

The price of middling uplands on the Cotton Exchange has swung in the wide range of 3.55 cents since our last report (January 16), high for the period being 36.45 on January 17 and low 32.90 today (February 10). The average price of middling uplands for the month of January was 36.09 cents, based on 25 trading days. This compares with an average of 36.74 cents for the month of December, 1947.

Cotton traders were greatly concerned by the commodity price structure as a whole, notwithstanding a strong statistical position in cotton. Dealers also felt that the parity trend will be downward and thereby lower the government support level on the next cotton crop.

Another item worrying the market, but not believed a factor in the general slump, was the news that the Senate Agricultural Committee would begin hearings on the bill introduced by Senator Barkley (Dem., Ala.) to give the Government control of commodity exchange margins.

Most sources, however, feel that any new farm legislation dealing with revisions in parity will not pass Congress this year. Despite reports of changes in parity stemming from Senator Aiken of Vermont, the cotton trade takes the view that the net result of the discussions and reports now in the making will be merely an extension of the present set-up for one year with only minor changes.

Quotations for middling uplands on the Exchange follow:

	Jan. 15	February 10		
	Close	High	Low	Close
March	35.67	33.80	31.93	31.93
July	34.55	33.31	31.44	31.44
October	31.68	31.02	29.30	29.25

Closing Rubber Prices on New York Commodity Exchange

FROM JANUARY 16 TO FEBRUARY 10

Date	Spot	Mar.	May	July	Sept.	Sales
Jan.						
16	21.62	21.50	20.30	19.55	19.05	226
17	——	——	——	——	——	——
18	——	——	——	——	——	——
19	21.12	21.10	19.80	19.18	18.75	282
20	21.37	21.30	20.07	19.30	19.10	259
21	21.62	21.60	20.44	19.75	19.42	108
22	21.37	21.28	20.23	19.50	19.15	128
23	21.12	21.15	20.00	19.40	19.03	124
24	——	——	——	——	——	——
25	——	——	——	——	——	——
26	21.00	20.95	19.80	19.30	18.85	177
27	20.75	20.66	19.60	19.06	18.60	180
27	21.00	21.10	19.95	19.39	19.05	150
29	21.00	20.95	19.90	19.24	18.88	59
30	21.12	21.20	20.05	19.40	19.05	123
31	——	——	——	——	——	——
Feb.						
1	——	——	——	——	——	——
2	21.25	21.40	20.32	19.60	19.21	139
3	21.50	21.20	20.40	19.77	19.23	144
4	20.75	20.60	19.75	19.15	18.70	226
5	21.00	20.75	19.85	19.60	18.85	225
6	20.50	20.25	19.55	19.05	18.54	165
7	——	——	——	——	——	——
8	——	——	——	——	——	——
9	20.75	20.70	19.95	19.54	18.95	138
10	20.37	20.05	19.40	18.99	18.40	224

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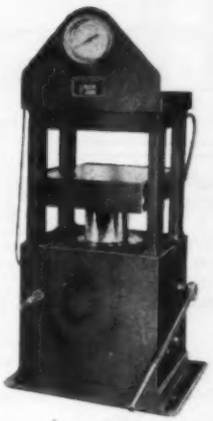

The M & N 30 ton electric hot plate molding press is specially designed for the rubber and plastics industries where speed and ease of operation are essential to low cost production. It is readily adapted for production runs or laboratory control work.

Available with any number of openings. Steam heated platens available at slight extra cost. Larger platens and motor-driven hydraulic power units are also available. Features of this M & N press include the visual temperature indicator, dual pressure hand pump, electrically heated and thermostatically controlled platens, all steel construction, and large platen areas.

SPECIFICATIONS

SIZE OF BASE	16" x 12"	DAYLIGHT OPENING	10"
OVERALL HEIGHT	42"	STROKE	6"
PLATEN SIZE	12" x 12"	RAM DIAMETER	5"
CAPACITY	30 tons	APPROX. WEIGHT	400 lbs.

HYDRAULICS DIVISION

M & N MACHINE TOOL WORKS, Inc.
148 Orono Street Clifton, N. J.

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LATEX
BALATA
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H. A. ASTLETT & CO.
27 William St. New York 5, N. Y.

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Pacific Rep. Lambard Smith, Los Angeles, Cal. N. Y. Office, 261 Broadway

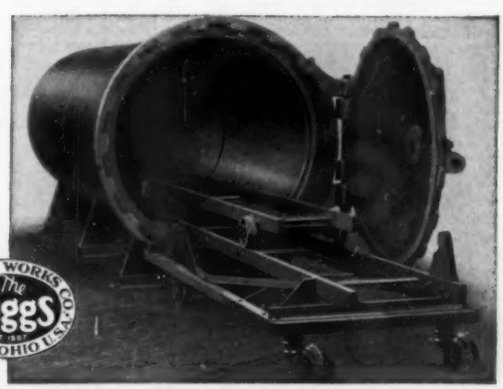

Fig. 18. Vulcanizer with inside car and outside transfer truck. Built to meet customers' requirements; all sizes.

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Biggs-built vulcanizers and devulcanizers have always had a prominent place in the development of the rubber industry. For over 47 years Biggs has furnished single-shell and jacketed vulcanizers both vertical and horizontal, as well as many different types of devulcanizers. Biggs modern all-welded units with quick-opening doors are available in all sizes for various working pressures—with many special features.

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THE *Biggs* BOILER WORKS CO.
1007-A BANK ST. • AKRON 5, OHIO, U. S. A.

CURRENT MARKET PRICES

Of Rubber Chemicals and Compounding Ingredients

FEBRUARY 10, 1948

Prices are, in general, f.o.b. works. Range of prices indicates grade or quantity variations.

Abbreviations: bbls., barrels; c.l., carlot; l.c.l., less than carlot; dlvd., delivered; t.c., tank cars; min., minimum; dms., drums; cyl., cylinder.

* East of Mississippi.

—The arrangement of this section follows closely the Chemical Section of the 1947 RUBBER RED BOOK to which readers are referred to determine the classification of any material or brand name.

—Although suppliers of every material were contacted for price information, only those materials are listed for which quotations have been furnished us. The quotations are not guaranteed and prospective purchasers should contact suppliers for confirmation before placing orders. Suppliers are requested to send us regularly current prices on all of their materials used in the rubber industry.

—All requests for information or listings should be sent to Market Editor, RUBBER AGE, 250 West 57th St., New York 19, N. Y.

ACCELERATORS

A-1	lb.	.34	.39
A-10	lb.	.40	.47
A-19	lb.	.52	.58
A-32	lb.	.59	.69
A-77	lb.	.42	.55
A-100	lb.	.42	.55
Accelerator No. 8 (dlvd.)	lb.	—	.75
Accelerator No. 49	lb.	.44	.45
Accelerator No. 89 (dlvd.)	lb.	—	1.20
Accelerator No. 122 (dlvd.)	lb.	—	1.30
Accelerator No. 552 (dlvd.)	lb.	—	1.63
Accelerator No. 808 (dlvd.)	lb.	.59	.61
Accelerator No. 833 (dlvd.)	lb.	1.13	1.15
Acrin (dlvd.)	lb.	—	.65
Advan	lb.	.52	.55
Altax	lb.	.35	.37
Arazate	lb.	—	2.16
Beutene	lb.	.59	.64
B-J-F	lb.	.27	.32
Butasan	lb.	—	1.10
Butazate	lb.	—	1.00
Butyl Eight	lb.	1.00	1.05
Captax	lb.	.27	.29
C-P-B	lb.	—	1.95
Cumate	lb.	—	1.45
Cuprax	lb.	.60	.62
Dibenzo G-M-F	lb.	—	2.65
Diorthotolylguanidine (dlvd.)	lb.	.48	.50
Diphenylguanidine (dlvd.)	lb.	.39	.40
El-Sixty	lb.	.39	.46
Ethasan	lb.	—	1.10
Ethazate	lb.	—	1.00
Ethyl Thiurad	lb.	—	1.25
Ethyl Tuex	lb.	—	1.00
Formaniline (dlvd.)	lb.	—	.40
G-M-F	lb.	—	2.50
Good-rite Erie	lb.	.53	.55
Guantal	lb.	.43	.50
Hepteen	lb.	.42	.48
Base	lb.	1.80	1.90
Ledate	lb.	—	1.00
Mercaptobenzothiazole	lb.	.27	.32
Mercaptobenzothiazyl Disulfide	lb.	.35	.40
Methasan	lb.	—	1.20
Methazate	lb.	—	1.00
Monex	lb.	—	1.10
Monô Thiurad	lb.	—	1.25
Morfex 33	lb.	.53	.58
2-MT (dlvd.)	lb.	.58	.60
Novac	lb.	—	1.40
A-13	lb.	.65	.67
O-X-A-F	lb.	.34	.39
Pentex	lb.	.74	.78
Flour	lb.	.12¼	.13¼
Phenex (tons)	lb.	—	.40
Pipazate	lb.	—	1.53
Pip-Pip	lb.	—	1.63
R-2 Crystals	lb.	—	1.55
Rotax	lb.	.3[illegible]	.41
SA 52	lb.	—	1.10
SA 57	lb.	—	1.00
SA 62	lb.	—	1.00
SA 66	lb.	—	1.45
SA 67	lb.	—	1.00
SA 77	lb.	—	1.00
Safex	lb.	—	1.15
Santocure	lb.	.53	.60
Selazate	lb.	—	1.45
Selenac (Ethyl, Methyl)	lb.	—	1.45
Setsit-5	lb.	.75	1.00
SPDX-G (tons)	lb.	—	.59
Tellurac	lb.	—	1.45
Tepidone (dlvd.)	lb.	—	.63
Tetrone (dlvd.)	lb.	—	1.25
A (dlvd.)	lb.	—	1.85
Thiocarbanilide (dlvd.)	lb.	—	.34
Thiofide	lb.	.35	.42
Thionex (dlvd.)	lb.	—	1.25
Thiotax	lb.	.27	.34
Thiurad	lb.	—	1.25
Thiuram E (and M) (dlvd.)	lb.	—	1.25
Trimene	lb.	.54	.64
Base	lb.	1.03	1.18
Triphenylguanidine (dlvd.)	lb.	—	.50
Tuads (Ethyl, Methyl)	lb.	1.00	1.10
Tuex	lb.	—	1.10
Ultex (tons)	lb.	—	1.23
Ureka	lb.	.55	.62
Blend B	lb.	.55	.62
C	lb.	.52	.59
Vulcanex (dlvd.)	lb.	—	.45
Z-B-X	lb.	—	2.45
Zenite (dlvd.)	lb.	.37	.39
A (dlvd.)	lb.	.42	.44
B (dlvd.)	lb.	.33	.35
Zimate (Butyl, Ethyl)	lb.	—	1.00
Zimate, Methyl	lb.	—	1.00

ACTIVATORS

Blue Lead, Sublimed (dlvd.)	lb.	.15¼	.15½
Fish Oil, Hydrogenated, Fatty Acid			
Hydrofol Acid (dlvd.)	lb.	.28¾	.32¼
Hyfac 52 (dlvd.)	lb.	.33	.34
Neo-Fat H.F.O. (dlvd.)	lb.	.33	.34
Stearex Beads (dlvd.)	lb.	.28	.29½
Lime, Hydrated			
Arrowhead	ton	16.00	19.50
Sierra	ton	16.00	19.50
Litharge			
Eagle (dlvd.)	lb.	.166	.176
FBS (dlvd.)	lb.	.166	.176
Magnesium Oxide, Heavy			
General Magnesite	lb.	.05½	.08
Michigan No. 15	lb.	.05	.05½
Permanente	lb.	.05	.06½
Magnesium Oxide, Light			
Baker's (Neoprene Grade)	lb.	—	.28
General Magnesite (Neoprene Grade)	lb.	—	.28
General Magnesite No. 101	lb.	—	.175
General Magnesite Standard	lb.	—	.22
K & M	lb.	—	.28
Michigan No. 30	lb.	—	.22½
No. 40	lb.	.25	.28
Witco Extra Light	lb.	.25	.27
Oleic Acid			
Elaine O-18 (dlvd.)	lb.	.30½	.32¾
L.C.P. Red Oil	lb.	.25½	.27¼
Red Oil (20-24 Saponified) (dlvd.)	lb.	.30½	.32¾
Palm Oil Fatty Acid (c.l.)	lb.	—	.11
Potassium Oleate (drums)	lb.	—	.29½
Red Lead			
No. 2 RM (dlvd.)	lb.	.181	.191
Sodium Laurate (drums)	lb.	—	.19
Sodium Oleate—Powder (drums)	lb.	—	.35
Paste (drums)	lb.	—	.20
Sodium Stearate—Powder (drums)	lb.	—	.35
USP Grade (drums)	lb.	—	.37
Stearic Acid, Single Pressed			
S-24 (dlvd.)	lb.	.36½	.37½
Stearex B (dlvd.)	lb.	.31½	.32½

ACTIVATORS (Cont'd)

Stearic Acid, Double Pressed			
Alba (dlvd.)	lb.	.39½	.41¾
S-2-A (dlvd.)	lb.	.37	.39½
S-2-B (dlvd.)	lb.	.36½	.39
Stearic Acid, Other			
Neo-Fat 1-60 (dlvd.)	lb.	.37½	.39
Neo-Fat 1-65 (dlvd.)	lb.	.38½	.39½
Stearite	cwt.	36.00	38.00
White Lead Carbonate (dlvd.)	lb.	.16	.16½
Zinc Laurate (c.l.)	lb.	—	.29
Laurex	lb.	.32	.35
Zinc Stearate	lb.	.51	.52
Aquazinc	lb.	.29	.35

Unclassified Activators

Actifat (dms.)	lb.	—	.18
Acidex	lb.	.19	.32
Aero Ac 50	lb.	.50	.56
165	lb.	.37	.39
Barak (dlvd.)	lb.	—	.60
D-B-A	lb.	—	1.95
Delac J	lb.	.55	.60
P	lb.	.45	.52
Dibutylamine No. 117 (l.c.l., dms.)	lb.	—	.69
Palmalene (drums)	lb.	—	.15
Dutch Boy Normasal	lb.	—	.38¾
Polyac (dlvd.)	lb.	—	1.40
Ridacto (drums)	lb.	.22	.24
Snodotte (dlvd.)	lb.	.30½	.31½
SOAC (min. 10 dms.)	cwt.	—	12.00
Triamylamine No. 180 (l.c.l., drums)	lb.	—	1.01

ANTI-COAGULANTS

Anhydrous Ammonia (l.c.l.)	lb.	.02½	.02¾
National (cyl., dlvd.)	lb.	.16	.20
Aqua Ammonia (l.c.l., dms.)	lb.	—	.03
M.B.M. (l.c.l.)	lb.	—	.35

ANTI-FOAMING AGENTS

Aero Anti Foam H	lb.	—	.12
Regular	lb.	—	.08½

ANTI-OXIDANTS

Agerite Alba	lb.	2.20	2.30
Gel	lb.	.55	.57
Hipar	lb.	.76	.78
H. P.	lb.	.58	.60
Powder	lb.	.43	.45
Resin	lb.	.60	.62
Resin D	lb.	.43	.45
Stalite	lb.	.43	.45
White	lb.	1.35	1.45
Akroflex C (dlvd.)	lb.	.58	.60
Aminox	lb.	.43	.52
Aranox	lb.	—	2.15
Benzoquinone	lb.	1.50	1.75
Betanox Special	lb.	.61	.70
B-L-E	lb.	.43	.52
Powder	lb.	.61	.63
B-X-A	lb.	.43	.45
Carvacrol	lb.	—	.85
Chlorcarvacrol	lb.	—	2.45
Flectol H	lb.	.43	.50
Flexamine	lb.	.58	.61
Gallic Acid, Tech.	lb.	1.10	1.23
USP or NF	lb.	1.27	1.40
Hydroquinone	lb.	.90	.90
Monomethylparaminophenol Sulfate	lb.	2.40	2.90
Neozone Standard (dlvd.)	lb.	.66	.68
A (dlvd.)	lb.	.43	.45
C (dlvd.)	lb.	.47	.49
D (dlvd.)	lb.	.43	.45
D Distilled (dlvd.)	lb.	.48	.50
Oxidex	lb.	—	3.40
Parazone (dlvd.)	lb.	—	.68
PDA-10	lb.	.37	.42
Perflectol	lb.	.58	.65
Permalux (dlvd.)	lb.	1.53	1.55
Pyrogallic Acid, Resublimed	lb.	2.60	2.65
USP Crystals	lb.	2.10	2.15
Resorcin, Tech. (dlvd.)	lb.	—	.64
Santoflex B	lb.	.43	.50
BX	lb.	.57	.64
Santovar-A	lb.	1.30	1.37
Santowhite	lb.	1.40	1.52
S.C.R. (tons)	lb.	—	.32
Solux (dlvd.)	lb.	1.48	1.50
Stabilite (tons)	lb.	—	.48
Alba (tons)	lb.	—	.69
L (tons)	lb.	—	.48

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Tannic Acid, Tech.	lb.	.70	.79
Thermoflex (dlvd.)	lb.	1.48	1.50
A (dlvd.)	lb.	.76	.78
C (dlvd.)	lb.	.54	.56
Thymol	lb.	—	2.50
V-G-B	lb.	.43	.52

ANTI-SCORCHING AGENTS

Good-rite Vultrol	lb.	.55	.57
Retarder W (dlvd.)	lb.	—	.43
Salicylic Acid, Tech.	lb.	—	.38
Sodium Acetate 60-62% Crystals	lb.	—	.05½

ANTISEPTICS AND GERMICIDES

Formaldehyde (barrels)	lb.	—	.062
G-4	lb.	.95	2.50
G-11	lb.	3.50	5.50
Methyl Para Hydroxy Benzoate	lb.	—	1.50
Nuodex 100 SS (dlvd.)	lb.	—	1.50
Nuodex 100 W.O. (dlvd.)	lb.	—	1.80
Nuodex Zinc 8 (dms.) (dlvd.)	lb.	—	.19¾
Ortho Cresol (26°-27°)	lb.	—	.18
Soligen Drier—Copper 8% (drums)	lb.	—	.21
Zinc 8% (dms.)	lb.	—	.19¾
Vancide	lb.	—	.80

AROMATICS (DEODORANTS)

Arolene 1980 (c.l.)	lb.	—	.10
2286	lb.	—	.25
2553 (c.l., dms.)	lb.	—	.13
Bouquet 149	lb.	—	3.00
Coumarin	lb.	—	2.75
Curodex 19	lb.	—	4.75
188	lb.	—	5.75
198	lb.	—	6.75
D-6 Masking Perfume	lb.	—	1.35
Deodorant 65	lb.	—	1.00
Deodorant L-37	lb.	2.00	2.40
L-44	lb.	2.50	2.90
N.L.T.X.	lb.	1.85	2.15
Latex Perfume 5	lb.	—	3.25
6	lb.	—	7.50
9	lb.	—	.65
Neutroleum Delta	lb.	—	2.40
Gamma	lb.	—	3.40
Parador A	lb.	2.00	2.50
B	lb.	.65	1.00
C	lb.	2.75	3.25
D	lb.	1.50	2.00
E	lb.	.25	.75
Perfume Oil Bouquet Vanilla M	lb.	2.40	2.75
Rodo No. 0	lb.	4.00	4.50
No. 10	lb.	5.00	5.50
Rubbarome (dms.)	lb.	1.10	2.10
Rubber Perfume 7	lb.	—	9.15
12	lb.	—	1.90
Russian Leather 7	lb.	—	4.10
Vanillin	lb.	3.00	3.05

BLOWING AGENTS

Ammonium Bicarbonate (dlvd.)	lb.	.06¾	.09¾
Blowing Agent No. 15	lb.	—	.35
Sodium Bicarbonate, U.S.P. (c.l., bags)	cwt.	—	1.85
Sponge Paste	lb.	—	.20
Unicel (dlvd.)	lb.	—	.60
ND (dlvd.)	lb.	—	1.00
Urea	ton	73.00	90.00

BONDING AGENTS

Durez 12987	lb.	.48	.53
Interlake Resin No. 4162	lb.	—	1.50
MDI	lb.	7.25	7.75
50	lb.	3.60	3.85
Reanite	gal.	6.75	7.25
Rex Compound 482	gal.	—	1.05
Ty-Ply Q (and S)	gal.	6.75	8.00

COAGULANTS

Acetic Acid—56% (bbls.)	cwt.	—	9.80
Glacial—99½% (bbls.)	cwt.	—	15.50
Calcium Nitrate, Tech., Crystals	lb.	.12½	.15
Hydroxyacetic Acid—70% (dms.)	lb.	.059	.084
Zinc Nitrate, Tech.	lb.	—	.21½

COLORING AGENTS

Black

Carbon Black—See *Reinforcing Agents*			
Aquablak B (also M, R)	lb.	.08¼	.09¼
Aquablak S	lb.	.07¾	.08¾
Lampblack No. 10	lb.	.06	.09
Mapico Black Iron Oxide (50 lbs. bags)	lb.	.09¼	.09½
Raven Black Pure Iron Oxide	cwt.	9.75	10.00

Blue

Blue GD, Dispersed (dlvd.)	lb.	—	3.95
Paste (dlvd.)	lb.	—	1.64
Blue N (dlvd.)	lb.	—	.94½
Blue YD, Dispersed (dlvd.)	lb.	—	2.50
Milori Blue 11840 (dlvd.)	lb.	—	.42
Monastral Fast Blue CP (dlvd.)	lb.	—	3.85
PCD, Dispersed (dlvd.)	lb.	—	2.50
Ramapo Blue	lb.	3.40	3.45
Rubber Blue X-1999	lb.	—	1.00
Stan-Tone Blue	lb.	1.40	4.00
Ultramarine	lb.	.14	.30
Victoria Blue BP-262-D	lb.	2.25	2.30

Brown

Brown Iron Oxide	lb.	—	.10
Mapico Brown (50 lb. bags)	lb.	—	.12

Green

Filo Green D-700 (and D-705)	lb.	—	.30
Green Chromium Oxide, Pure	cwt.	31.50	38 50
Green Chromium Oxide, Pure, Hydrated	cwt.	75.00	85.00
Green FD, Dispersed (dlvd.)	lb.	—	1.50
Monastral Fast Green GSD, Dispersed (dlvd.)	lb.	—	3.20
GSD Paste (dlvd.)	lb.	—	1.10
Permansa Green CP-594	lb.	—	1.35
Pigment Green B	lb.	—	1.50
GL-652D	lb.	.88	.93
Ramapo Green	lb.	4.00	4.05
Rubber Green X-1292	lb.	—	1.00
Stan-Tone Green	lb.	1.50	3.30
Utility Green	lb.	—	.30

Maroon

Stan-Tone Maroon	lb.	2.50	2.55

Orange

Molybdate Orange	lb.	—	.39
Orange F (dlvd.)	lb.	—	3.65
FD, Dispersed (dlvd.)	lb.	—	2.75
Rubber Orange X-2065	lb.	—	2.60
Stan-Tone Orange	lb.	1.65	2.25

Red

Cadmium Red	lb.	.95	1.25
Cadmolith Red (bbls.)	lb.	1.10	1.35
Graphic Red (dlvd.)	lb.	—	.75
Indian Red, Pure	cwt.	10.00	10.25
Mapico Red 297 (50 lb. bags)	lb.	.10	.10¼
Oximony Iron Oxide	lb.	—	.09
Red Iron Oxide, Light	cwt.	10.25	10.75
Red PB (dlvd.)	lb.	—	1.80
PBD, Dispersed (dlvd.)	lb.	—	1.65
2B (dlvd.)	lb.	—	1.65
2BD, Dispersed (dlvd.)	lb.	—	1.65
Rubanox Red CP-762 (dlvd.)	lb.	—	1.30
Rubber Red CP-339 (dlvd.)	lb.	—	1.05
Rubber Red RT-364	lb.	—	.75
Rubber Red RT-425	lb.	—	.75
Rubber Red X-1148	lb.	—	.75
Solfast Red CP-663 (dlvd.)	lb.	—	1.80
CP-787 (dlvd.)	lb.	—	1.30
Stan-Tone Red	lb.	1.10	1.55
Watchung Red	lb.	—	1.80

White—Lithopone

Albalith	lb.	.06	.06¼
Astrolith	lb.	.055	.0578
Cryptone No. 19	lb.	.07½	.07¾
CB No. 21	lb.	.07½	.07¾
Eagle	lb.	.06	.06½
Permalith	lb.	.06	.06¼
Ponolith	lb.	.06	.06¼
Sunolith	lb.	.055	.0578

White—Titanium Pigments

Rayox	lb.	.17½	.20½
Ti-Cal	lb.	.06¾	.07¼
Ti-Pure	lb.	.17½	.18½
Titanox A—all grades (dlvd.)	lb.	.17½	.18
B-30 (dlvd.)	lb.	.07	.07½
C (dlvd.)	lb.	.06¾	.07¼
RA—all grades (dlvd.)	lb.	.19½	.20
RC-HT (dlvd.)	lb.	.06¾	.07¼
Zopaque	lb.	.16½	.17¼

White—Zinc Oxide (American Process)

AZO-ZZZ 11 (and 22, 33, 44, 55)	lb.	.10	.10¼
Eagle	lb.	.10	.10¼
Horse Head Special	lb.	.10	.10¼
XX Red	lb.	.09½	.09¾
Jozite	lb.	.08¾	.08¾
St. Joe Black Label	lb.	.10	.10¼
Green Label	lb.	.10	.10¼
Red Label	lb.	.10	.10¼

White—Zinc Oxide (Dispersed)

Dispersed Zinc Oxide	lb.	—	.13

White—Zinc Oxide (French Process)

AZO-ZZZ 66	lb.	.12¼	.12½
Eagle Green Seal	lb.	.11¾	.12
Eagle Red Seal	lb.	.11¾	.11¾
Eagle White Seal	lb.	.12¼	.12½
Florence Green Seal	lb.	.11¾	.12
Red Seal	lb.	.11¼	.12½
White Seal	lb.	.12¼	.12½
Kadox 72	lb.	.10	.10¼
Black Label	lb.	.10	.10¼
Red Label	lb.	.10	.10¼
U. S. P. 12	lb.	.13¼	.13½

White—Zinc Sulfide

Cryptone ZS-800	lb.	.10	.10¾

Yellow

Anchor Brand Pure Iron Oxide	cwt.	8.25	8.50
Cadmolith Yellow (bbls.)	lb.	—	.85
Chrome Yellow	lb.	—	.27
Chrome Yellow 12310	lb.	—	.27
Ferrox	cwt.	7.50	8.50
Mapico Yellow (50 lb. bags)	lb.	.07¾	.08
Rubber Yellow X-1940	lb.	—	1.60
Stan-Tone Yellow	lb.	1.20	1.75
Toluidine Yellow	lb.	—	1.60
YL-556-D	lb.	.75	.80
Oximony Iron Oxide	lb.	—	.06¾
Yellow G (dlvd.)	lb.	—	1.95
GD, Dispersed (dlvd.)	lb.	—	1.85
HN (dlvd.)	lb.	—	1.60
Zinc Yellow	lb.	—	.19

DISPERSING AGENTS

Agchem SA-19	lb.	—	.30
SA-20	lb.	—	.70
Aquasol-AR 90%	lb.	—	.14½
Beaconol 52	lb.	.60	.75
Darvan No. 1 (and No. 2)	lb.	.30	.40
Daxad 11 (21, 23)	lb.	.07	.35
Dilex	lb.	—	.32
Dispersaid	lb.	1.25	1.35
Halloid	lb.	.03¾	.09½
HornKem No. 1	gal.	—	1.60
No. 3G	gal.	—	1.75
No. 12	lb.	—	.17
Marasperse CB	lb.	.11½	.15
N	lb.	.09	.10
Ramol PW	lb.	.18	.19
Rubbex	lb.	—	.27½
Stan-Chem BQC	lb.	.12¼	.17¼
1067	lb.	—	.13½
1471	lb.	.1687	.2187
2251	lb.	.12¼	.17¾
Triethanolamine (drums) (dlvd.)	lb.	.21½	.22½
Triton R-100	lb.	.15½	.25
Yelkin TT	lb.	—	.22
Zinsper	lb.	—	.15

EXTENDERS

Advagum 1098	lb.	—	.65
Bunaweld Polymer No. 780	lb.	—	.22
No. 5514	lb.	—	.30
D-92 (and D-93) (dms.)	lb.	—	.12
Extender 600	lb.	—	.208
Multi-Plast MV 60 Emul.	gal.	.32	.37
PR-162 Latex (dms.)	gal.	1.00	1.60
Synprolac	lb.	—	.19
Synprowax	lb.	.16	.19
Vistanex	lb.	—	.32

FILLERS (Inert and Reinforcing)

Abrasives			
Carbonite	lb.	.15	.95
Lionite	lb.	.09¾	.90
Pumice	lb.	.03	.05
Aluminum Hydrate	lb.	—	.17
Aluminum Silicate			
Silical	ton	37.00	55.00
Marter White	ton	20.50	30.00
Barium Carbonate (l.c.l.)	ton	77.00	85.00
Barytes			
No. 1 Floated, White	ton	33.10	44.55
No. 2 Floated, Unbleached	ton	31.10	41.95
No. 22 Barytes (c.l.)	ton	—	18.37
Foam A	ton	—	30.10
Bentonite (c.l.)	ton	—	11.00
SPV Volclay (c.l.)	ton	—	11.00
Blanc Fixe	ton	72.50	120.00
Calcium Carbonate			
Atomite (c.l.)	ton	—	30.00
B.I. White No. 1 (c.l.)	ton	—	7.50
B.I. White No. 2 (c.l.)	ton	—	7.00
Blue-Star XX	ton	—	45.00
Calcene T	ton	40.00	50.00
Camelwite	ton	—	30.00
Kalite (c.l.)	ton	—	33.00
Lesamite (c.l.)	ton	—	27.50
Lim-Cal (c.l.)	ton	—	12.50
Millical (c.l.)	ton	—	25.00
Multifex	ton	—	105.00
Sierracal	ton	15.00	18.50
Suspenso (c.l.)	ton	—	22.00
Swansdown (c.l.)	ton	—	20.00
Witcarb R (c.l.)	ton	—	105.00
R-12 (c.l.)	ton	40.00	60.00

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New Vinyl Stabilizer

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Armour's 332 stock points mean fast, dependable service

U. S. P.... A chemically-pure, water-white glycerine, meeting all requirements of the U. S. Pharmacopoeia ... for use in foods, pharmaceuticals, cosmetics or any purpose demanding highest quality. Specific gravity, 1.249—25° C./25° C.

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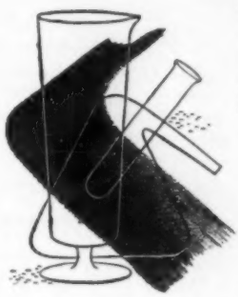

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★ EXCELLENT ABRASION RESISTANCE
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★ HARDNESS and STIFFNESS

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SUNBURY, PENNA.

FILLERS (Cont'd)

Calcium Silicate			
Silene EF	ton	110.00	-120.00
Calcium Sulfate, Anhydrous			
Snow White Filler	ton	—	- 17.00
Calcium Sulfate, Hydrous			
Crysta-Cal (c.l.)	ton	—	- 12.50
Terra Alba No. 1	ton	12.00	- 14.40
Chalk Whiting (l.c.l.)	lb.	.0150	- .0175
Recco Paris Whiting	ton	—	- 26.00
Clay			
Alsite (c.l.)	ton	—	- 13.00
Aluminum Flake	ton	16.50	- 60.00
A.S.P. No. 1 (c.l.)	ton	—	- 35.00
No. 11 (c.l.)	ton	—	- 40.00
Buca (c.l.)	ton	—	- 44.00
Catalpo (c.l.)	ton	—	- 33.00
Champion	ton	—	- 13.00
C.S.D. (c.l.)	ton	—	- 12.00
Crown	ton	—	- 13.00
Dixie (c.l.)	ton	—	- 29.50
Hydratex R	ton	28.00	- 40.00
Kaolloid Clay (c.l.)	ton	—	- 10.50
Markham (c.l.)	ton	—	- 13.00
McNamee (c.l.)	ton	—	- 29.00
Oldham (c.l.)	ton	—	- 13.00
Paragon	ton	12.50	- 27.20
Recco (c.l.)	ton	—	- 13.00
Stellar-R	ton	—	- 50.00
Suprex	ton	13.00	- 27.70
Upton	ton	19.50	- 21.00
Whitetex (c.l.)	ton	—	- 50.00
Witco No. 1 (c.l.)	ton	13.00	- 33.00
No. 2 (c.l.)	ton	13.00	- 33.00
Diatomaceous Earth	ton	30.00	- 50.00
Kaylorite (c.l.)	ton	—	- 30.00
Dolomite (c.l.)	ton	11.00	- 12.00
Flock			
Cotton	lb.	.08½	- .20
Filfloc F 40-9000	lb.	—	- .16
Filfloc F 6000	lb.	—	- .22
Rayon, bleached or dyed	lb.	.85	- 1.50
Rayon, grey	lb.	—	- .18
Sofka-Floc (l.c.l.)	lb.	.05	- .12
Wool, bleached or dyed	lb.	.70	- 1.00
Glue, Bone (dlvd.)	lb.	.16½	- .18½
Graphite	lb.	.05	- .20
Ground Glass (l.c.l.)	lb.	.04	- .06
Leather, Shredded	lb.	.05	- .17
Lignin	lb.	.03	- .06
Indulin	lb.	—	- .09
Limestone, Pulverized	ton	3.25	- 10.00
Micro Velva	ton	30.00	- 32.00
Velvet Filler, Regular	ton	16.00	- 18.00
Magnesium Carbonate	lb.	.08	- .09
Clearcarb	lb.	.10¾	- .11¼
K & M	lb.	.08	- .09
Magnesium Oxide	lb.	.05	- .06
Magnesium Silicate	ton	18.00	- 35.00
Airex	ton	22.50	- 23.50
Asbestol	ton	17.00	- 25.00
Blue Star Talc	ton	—	- 21.00
L.S. Silver	ton	24.50	- 26.50
Sierra White	ton	20.75	- 22.75
Mica	lb.	.01¼	- .07¾
Concord	lb.	.07	- .07¾
Micro-Mica	lb.	.06¾	- .07½
Mineralite (c.l.)	ton	30.00	- 40.00
Silversheen	lb.	.06½	- .07
Triple A Mica (c.l.)	ton	—	- 25.00
Wet Ground Biotite Mica	lb.	.05½	- .06¼
Wet Ground Mica No. 160	lb.	.06¾	- .07½
Mineral Black			
Keystone 126	ton	—	- 13.00
Pyrophyllite			
Pyrax A (c.l.)	ton	—	- 30.00
WA (c.l.)	ton	—	- 31.50
Silica	ton	16.00	- 27.00
Blue Star	ton	—	- 21.50
Slate, Powdered (l.c.l.)	ton	15.00	- 20.00
Talc, Domestic	ton	9.00	- 20.00
Walnut Shell Flour	ton	38.00	- 80.00
Whiting, Commercial	ton	8.00	- 20.00
Cameline (c.l.)	ton	8.50	- 10.00
C-C-O White	ton	—	- 14.50
Keystone (c.l.)	ton	—	- 16.00
Rambo No. 1 White	ton	—	- 9.00
Snowflake (c.l.)	ton	—	- 18.00
Veroc (c.l.)	ton	—	- 8.50
York White (c.l.)	ton	—	- 9.00
Wood Flour	ton	20.00	- 62.18

FINISHING MATERIALS, SURFACE

Beaco Finishes	gal.	1.05	- 1.35
Black Out	gal.	4.50	- 8.00
Shellac, Orange Gum	lb.	.60	- .70
VanWax	gal.	1.25	- 1.30

FLAME RETARDANTS

Chlorinated Paraffin	lb.	.10	- .25
Halowax	lb.	.24	- .30
Zinc Borate 3167	lb.	.12	- .16¾
Zyrox	lb.	.71	- .79

LUBRICANTS, MOLD

Aquadag	lb.	3.15	- 3.45
Aquarex BBX Conc. (dlvd.)	lb.	—	- .78
D (dlvd.)	lb.	—	- .76
L Paste (dlvd.)	lb.	—	- .85
MDL Paste (dlvd.)	lb.	—	- .30
Borax, Granular (l.c.l.)	ton	70.00	- 80.00
Colite Concentrate (dms.)	gal.	—	- .90

LUBRICANTS, MOLD (Cont'd)

Concentrex	lb.	—	- .20
Dipex	lb.	.14	- .18
Dri-Lube	lb.	—	- .18
Erlen Mold Lubricant	gal.	1.25	- 1.50
Glycerized Lubricant	gal.	—	- 1.50
Glydag	lb.	1.30	- 2.00
Kokobace	lb.	—	- .12
Latex-Lube (dlvd.)	lb.	—	- .22¾
Liqui-Lube (dlvd.)	lb.	—	- .16¾
Lubrex	lb.	.25	- .30
Migralube	lb.	—	- .30
Moldex	lb.	—	- .12½
Moldeze No. 1	gal.	—	- 36.00
No. 2	gal.	—	- 10.00
No. 3	gal.	—	- 25.00
Mold-Slick	lb.	.202	- .215
Orvus WA Paste (dms.)	lb.	—	- .25
Prodag	lb.	.25	- .38
Redotex Flakes (dlvd.)	lb.	.27⅜	- .28
Powder (dlvd.)	lb.	.27⅞	- .28½
Rubber-Flo	gal.	—	- 1.15
Rubber-Glo	gal.	—	- .94
Rusco Mold Paste	lb.	—	- .18
Sericite (l.c.l.)	ton	65.00	- 75.00
Ulco Mold Soap	lb.	.16	- .29
Werkrite Flakes (dlvd.)	lb.	.26⅛	- .27
Powder (dlvd.)	lb.	.27⅛	- .27¾

LUBRICANTS, RUBBER

Lithium Stearate	lb.	.75	- .77
Propylene Stearate (drums)	lb.	—	- .40
Rubberol	lb.	—	- .18½

LUBRICANTS, RUBBER SURFACE

Barium Stearate	lb.	—	- .43
Calcium Stearate	lb.	—	- .48
Orel	gal.	1.85	- 2.00
Polyethylene Glycol	lb.	.25	- .26
Rexanol A	lb.	—	- .11
Separex A	lb.	—	- .15
Zinc Stearate	lb.	.54	- .55

MOLD CLEANERS

Actusol (dlvd.)	gal.	—	- 1.45
Metso 99	cwt.	3.05	- 4.45
Granular	cwt.	2.50	- 3.55
Rubber-Sol	gal.	—	- 1.89
Shelblast	ton	80.00	-140.00
Sodium Silicate	cwt.	.80	- 1.40
Sprex A.C. (dlvd.)	lb.	—	- .15½

PEPTIZING AGENTS

Peptizer P-12	lb.	.84	- .90

PLASTICIZERS & SOFTENERS

AA (drums)	lb.	—	- .15¾
Acto 500	lb.	—	- .09
Adipol BCA (dms.)	lb.	.44½	- .45
Amalgamator Z-4	lb.	—	- .30
American Pine Tar	gal.	.32	- .43
Bardex	lb.	.05	- .05¼
Bardol	lb.	.02¾	- .03¾
B	lb.	.05½	- .05¾
Bayol D	gal.	.29½	- .31½
F	gal.	.46	- .49
Beeswax, Refined & Bleached	lb.	.64	- .74
Yellow Refined	lb.	.63½	- .68
Bondogen	lb.	.55	- .60
B.R.C. No. 20	lb.	.0125	- .0135
B.R.H. 2	lb.	.02	- .029
BRS 700	lb.	.0175	- .026
B.R.T. 3	lb.	.024	- .025
4	lb.	.0225	- .0235
7	lb.	.0265	- .0275
B.R.V.	lb.	.0325	- .04
Bunarex Resins	lb.	—	- .075
Bunatak M	lb.	—	- .20
O	lb.	—	- .18
R	lb.	—	- .14
U	lb.	—	- .15
No. 21	lb.	—	- .08
No. 90	lb.	—	- .08
No. 865	lb.	—	- .17
No. 1080	lb.	—	- .09½
Burgundy Pitch	lb.	.1026	- .1050
Butac	lb.	.11	- .12
Butyl Benzyl Sebacate	lb.	.75	- .77½
Butyl Palmitate	lb.	—	- .26⅝
Butyl Roleate	lb.	.176	- .18
BWH-1	lb.	—	- .11
Campol (t.c.)	ton	—	- 42.00
Candelilla Wax, Prime	lb.	.78	- .85
Carbonex	lb.	.0325	- .0375
S Flakes	lb.	.0475	- .0525
S Plastic	lb.	.046	- .051
Carbowax 4000 (drums)	lb.	.29	- .30
Cardolite 615	lb.	.37	- .40
816	lb.	.25½	- .28½
5858	lb.	.42	- .46
Carnauba Wax, Crude	lb.	1.30	- 1.35
Refined	lb.	1.40	- 1.45
Substitute	lb.	.45	- 1.08
Yellow	lb.	1.75	- 1.80

PLASTICIZERS & SOFTENERS (Cont'd)

Celluflex 142 (and 179 (drums)	lb.	—	- .37½
Ceresine Wax	lb.	.15	- .20
Contogum	lb.	.06¾	- .10¼
Cumar Resins	lb.	.05½	- .14½
D.B.M.	lb.	—	- .30
Degras, Common	lb.	.10	- .14
Diamylphenol (l.c.l., dms.)	lb.	—	- .21
Dibenzyl Ether (drums)	lb.	—	- .40
Dibenzyl Sebacate	lb.	.66	- .70½
Dibutyl Phthalate	lb.	.36	- .385
Dibutyl Sebacate—Tech.	lb.	.75¼	- .77¾
C.P.	lb.	.77¾	- .80¼
Dicapryl Phthalate	lb.	—	- .45
Di-Carbitol Phthalate (dms.)	lb.	.39½	- .40
Dicyclohexyl Phthalate	lb.	—	- .43
Dielex	lb.	.05½	- .06
Diethyl Phthalate (t.c.)	lb.	.31½	- .38½
Dihexyl Sebacate	lb.	.73¾	- .76¼
Dimethyl Phthalate	lb.	—	- .26
Dimethyl Sebacate	lb.	.77¾	- .80¼
Dinopol (dms.)	lb.	.46½	- .47
Dioctyl Phthalate (dms.)	lb.	.42½	- .43
Dipolymer Oil	gal.	.33	- .38
Dispersing Oil No. 10	lb.	.0525	- .055
Dutrex A (B, 5, 6)	lb.	.02½	- .03¾
15	gal.	.10	- .189
20, 21, 25	lb.	—	- .03
Econo-Plast (drums)	lb.	.03¼	- .03¾
ELA (dlvd.)	lb.	—	- .80
Estac	lb.	—	- .16
Ethox (dms.)	lb.	.38½	- .39
Flexol DOP	lb.	—	- .433
TOF	lb.	—	- .47
3GH	lb.	—	- .56
3GO	lb.	—	- .53½
4GO	lb.	—	- .43
H-70	lb.	.56¾	- .64½
Hercolyn (dlvd.)	lb.	.15½	- .16
Herron-H.T.	gal.	.17	- .23
Herron-Plas	lb.	—	- .03½
Herron-Wax	lb.	—	- .05¼
HT-300	lb.	.45¾	- .53
Indonex 633½ (634½, 638½, 639½)	gal.	.11½	- .16
VG (dlvd.)	lb.	—	- .07
Indopol H-300 (bbls.)	gal.	1.28	- 1.32
JMH	lb.	—	- .65
Kapsol (dms.)	lb.	.44½	- .45
KP 23 (dms.)	lb.	.41½	- .42
70 (dms.)	lb.	.40½	- .41
120 (dms.)	lb.	.48½	- .49
140 (dms.)	lb.	.49½	- .50
150 (dms.)	lb.	.38½	- .39
Kronisol (drums)	lb.	.38½	- .39
Kronitex (drums)	lb.	.32½	- .37
Lanolin, Tech. Anhydrous	lb.	.20	- .26
Lead Oleate	lb.	.16½	- .42
Lindol (drums)	lb.	—	- .33½
2-Mercaptoethanol (drums)	lb.	—	- .75
Methox (dms.)	lb.	.35½	- .36
Methyl Oleate	lb.	—	- .20
Methyl Stearate	lb.	—	- .34
Monoplex DBS	lb.	.90	- .91
Monoplex DOS	lb.	.84	- .85
5 (dms.)	lb.	.98	- 1.00
11 (dms.)	lb.	.50	- .51
16 (dms.)	lb.	.45	- .46
Montan Substitute No. 506	lb.	.425	- .435
Montan Wax, Crude	lb.	.50	- .55
Monten Wax (c.l.)	lb.	.52	- .55
Monty Wax	lb.	—	- .35
Multi-Plast (drums)	lb.	.04½	- .05
Naftolen HV (and R-100) (drums)	lb.	.11	- .12
LV and MV (drums)	lb.	.05¼	- .05¾
Natac	lb.	.1050	- .1150
Neolene 210 (t.c.)	lb.	—	- .16
212 (t.c.)	lb.	—	- .14
220 (t.c.)	lb.	—	- .15
Nerium	lb.	—	- .09
Nevillac Resins (dms.)	lb.	.23	- .45
Neville Resins (dms.)	lb.	.09	- .14½
Nevindene Resins (dms.)	lb.	.11½	- .14½
Nevinol (dms.)	lb.	—	- .16
Nevoll	lb.	.03	- .04
Nevtex 10 (dms.)	lb.	—	- .08½
Nuba 1 (and 2) (dms.)	lb.	—	- .03½
3X (dms.)	lb.	—	- .05
15 (and 30) Oil (dms.)	lb.	—	- .17¼
781 Oil (dms.)	lb.	—	- .22
No. 480 Oil Proof Resin	lb.	—	- .15
Opalwax	lb.	—	- .45
Ortho-Nitrobiphenyl	lb.	.06	- .11
Ozokerite Wax No. 64 White	lb.	.31	- .32
Yellow	lb.	.25	- .26
P-1 (and 4, 6, 8, 20)	lb.	.26½	- .33
P-75	lb.	.66	- .72
Pale 4 (and 1000)	lb.	—	- .17¼
Palm Oil	lb.	—	- .11
Paradene Resins (dms.)	lb.	.05½	- .06½
Para Flux (dms.)	gal.	.18	- .19
2016 (l.c.l.)	gal.	.20	- .21
Para Lube (l.c.l.)	lb.	.046	- .048
Paraplex G-25	lb.	.90	- .91
G-40	lb.	.48¾	- .49¾
Parmo	lb.	.06	- .13½
Pentalene 90 (l.c.l., dms.)	lb.	—	- .17
92 (l.c.l., drums)	lb.	—	- .25

UTILITY FAN OR V-BELT COVERING MACHINE FOR VARIOUS SIZES AND CROSS-SECTION BELTS

UTILITY MANUFACTURING COMPANY

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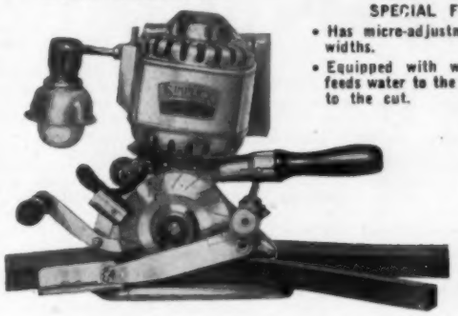
MILWAUKEE—SHERIDAN 7020

SIMPLEX
REG. TRADE MARK

RUBBER STRIP CUTTER

PATENTED

A PORTABLE machine capable of stripping slab rubber up to 1″ thick at the rate of 20,000 feet in 8 hours. Any width desired.



SPECIAL FEATURES

- Has micro-adjustment for accurate widths.
- Equipped with water tank which feeds water to the slotted knife and to the cut.
- Has repulsion-induction motor which carries any overloads.
- Automatic sharpener device keeps knife keen and sharp.
- Has base with rollers and is very easy to handle.

Cuts within 1/64 inch to 1/100 inch tolerance depending on grades of rubber. Cuts a slab down to the last shaving. Cuts all grades of rubber including pure gum, sponge, etc. Cuts squarely—no rejects.

Now in use by many leading Rubber Manufacturers & Jobbers

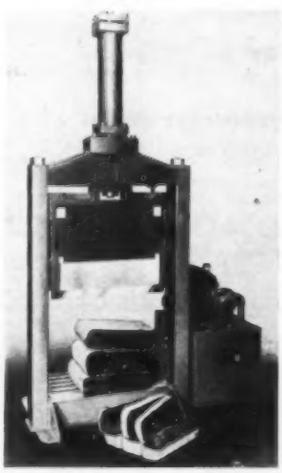
Simplex Cloth Cutting Machine Co., Inc.

Manufacturers of a Complete Line of Cloth Cutting Machinery

270 West 39th St. New York 18, N. Y.

Cable Address—SIMPLEX, N. Y. *Phone*—WIsconsin 7-5547

CRUDE RUBBER BALE CUTTER



Complete Unit

Fully Assembled

Hydraulic

Operation

High Production

•

An efficient machine of simple design for cutting bales of crude, synthetic and reclaimed rubber or similar materials. Cuts without aid of water or other lubricant. One man operation—safety control.

•

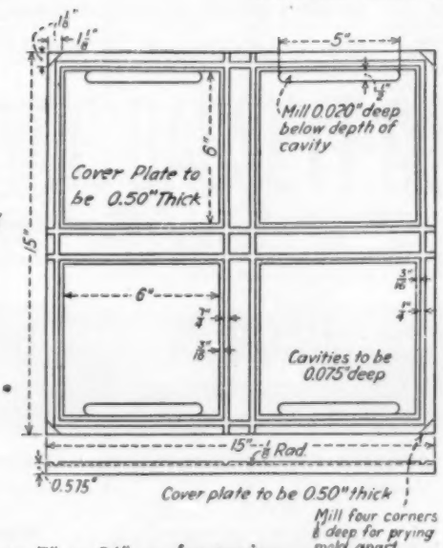
SPADONE MACHINE COMPANY

10 East 43rd St. New York 17, N. Y.

HOGGSON BRAND
Since 1849

MOLDS & DIES FOR RUBBER TESTING

ONE OF THE MANY MOLDS AVAILABLE



Molds from 7″ to 24″ sq. for tension samples, and molds for compression samples if desired. Molds in dimensions varying from 1″ x 1″ x ¼″ up for abrasion test samples. Molds and dies for slab curing. Please describe your need.

HOGGSON & PETTIS MFG. CO.

141A Brewery St., New Haven 7, Conn.

Pac. Coast: H. M. Royal Inc. Los Angeles

PLASTICIZERS & SOFTENERS (Cont'd)

Pentaphen No. 114 (l.c.l., bags)	lb.	——	.23
Pepton 22	lb.	.70	.75
PG-16 (drums)	lb.	——	.34
Philplast No. 1	gal.	.18	.35
No. 2	gal.	.13	.35
Picco 10 (and 25)	lb.	——	.12
75 (and 100)	lb.	——	.11½
S.O.S.	gal.	.29	.34
Piccocizer 30	lb.	.05½	.06
Piccolastic A (and B, C, D, E)	lb.	.20	.20½
F	lb.	.12¼	.13
Piccolyte S Resins	lb.	.17	.20½
Piccoumaron Resins	lb.	.06½	.14½
Piccovar	lb.	.12	.12½
Piccovol	lb.	.02½	.04
Pictar	gal.	.25	.30
Plas-Blend 360	lb.	.03¾	.04½
Plastac M	lb.	——	.09¾
Plasticizer No. 1889	lb.	——	.77
No. 2869 (l.c.l.)	gal.	——	.23
No. 2070 (l.c.l.)	gal.	——	.30
Plasticizer SC	lb.	.50	.52
Plasticizer VA-1	lb.	——	.40
Plastoflex 50	lb.	.36	.37
J-21	lb.	——	.41
Plastogen	lb.	.07¾	.08
Plastolein X-55 (dms.)	lb.	——	.60
X-148 (dms.)	lb.	——	.70
Plastone	lb.	.27	.30
Polymel D	lb.	——	.20
Polymel Liquid	gal.	.12	.17
Polymel Resins	lb.	.029	.05
PT 400 (600, 800) (c.l., dms.)	gal.	.30	.39
Refrigerator Oil 145-R	gal.	——	1.25
Reogen	lb.	.11½	.12
465 Resin (drums)	lb.	——	.04½
Resin 731	lb.	——	.13¾
Resin C	lb.	.02	.0275
Resinex	lb.	.02¼	.03½
L-4	lb.	.01¾	.02½
Ridbo 369 (drums)	lb.	.08	.09
369-F (drums)	lb.	——	.12
Rosin Oil	gal.	.54	1.20
R.P.A. No. 2 (dlvd.)	lb.	——	.65
No. 3 (dlvd.)	lb.	——	.46
No. 5 (dlvd.)	lb.	——	.57
R.S.O. Softening Oil	lb.	.03	.05
Rubtar	gal.	——	.40
Santicizer B-16	lb.	.50	.57
E-15	lb.	.47	.54
M-17	lb.	.44	.51
No. 140	lb.	.31	.38
Softener No. 20	gal.	.09	.25
S.P.C.	lb.	——	.19½
Stanolind Petrolatum	lb.	.037	.081
Wax	lb.	.25	.30
Staybelite Resin (dms.)	lb.	——	.11
Sunny South Burgundy Pitch	cwt.	10.51	10.75
Sunny South Pine Tar	gal.	.30	.41
Sunny South Rosin Oil	gal.	.50	.67¾
Superla Wax	lb.	.25	.30
Syncera Wax	lb.	.175	.225
Synplasticizer	lb	——	.10
Syn Tac (c.l.)	gal.	——	.33
Synthol	lb.	——	.22½
Tar, Refined	gal.	.12	.17
K-Tarnel NR (t.c.)	lb.	——	.0851
Terpene A	gal.	——	.65
TP-90B (and TP-95)	lb.	.65	.75
TP98	lb.	.55	.65
Triacetin	lb.	.34	.45
Tricresyl Phosphate	lb.	.31	.38
Turgum S	lb.	.09½	.10½
Vanadiset B, C, D	lb.	.021	.055
Pulverized	lb.	.08½	.31
Solution	gal.	.40	.65
Vistac No. 1	gal.	——	1.32
No. 2	gal.	——	1.66
No. 4	gal.	——	1.80
Wilcor-Plast	lb.	.02½	.02¾
Witresin—Granular	ton	41.00	43.00
Solid	ton	36.00	38.00

PROCESSING AIDS

Castor Oil, Processed (dms.)	lb.	——	.17¼
Refined (drums)	lb.	——	.15¾
Castorwax (min. 400 lbs.)	lb.	——	.25
Dutrex 7	lb.	.02½	.03¾
30	gal.	.24	.27
ELA (dlvd.)	lb.	——	.80
Resin No. 510	lb.	——	.19
Zeton (dms.)	lb.	——	.32

PROTECTIVE & STABILIZING AGENTS

Agchem SA-9 (to SA-12)	lb.	.65	1.02
Alpha Protein	lb.	.28	.32
Arcostocrat	lb.	——	.07½
Acacia	lb.	.12¼	.21
Carob Bean Flour	lb.	.42	.50
Casein	lb.	.33	.40
Ethylene Diamine 68%	lb.	.57	.58
Karaya Gum	lb.	.36	.45
Prosein	lb.	.071	.09
Rex Compound No. 2801	lb.	——	.15
Sodium Alginate	lb.	——	1.50

PROTECTING AGENTS (Cont'd)

Stablex B	lb.	——	.95
Tragacanth Flakes	lb.	.60	1.35

RECLAIMING AGENTS

1-D Heavy Oil (drums)	lb.	.04	.05
No. 517 H.B. Oil	gal.	.11⅛	.16⅛
535	gal.	.22	.27
No. 523 H.S. Oil	gal.	.22	.27
C-6 Oil (and 28, 32)	gal.	.33	.38
C-10 Oil	gal.	.25	.30
C-33 Oil	gal.	.21½	.26½
Caustic Soda—Flake 76% (c.l., drums)	cwt.	——	3.25
Liquid 50% (t.c.)	cwt.	——	2.25
Solid 76% (c.l., dms.)	cwt.	2.50	2.85
Cresylic Acid (99-100%)	gal.	1.20	1.29
D-4	gal.	.19	.24
E-5	gal.	.17	.22
Heavy Aromatic Naphtha (t.c.)	gal.	——	8.25
LX-83 Reclaiming Solvent	gal.	.13	.24
LX-572 Reclaiming Oil	gal.	.17	.28
PT 75 (and 101)	gal.	.30	.39
PT 150 Solventene	gal.	.60	.75
Q Oil	gal.	.206	.256
Reclaiming Oil 1621	lb.	.025	.035
Reclaiming Reagent No. 3	lb.	.12	.15
Reclaiming Resin No. 1	gal.	.15	.35
R.P.A. No. 3 (dlvd.)	lb.	——	.46
Soda Ash (c.l., bags)	cwt.	——	1.20
Solvent 534	gal.	.22	.27
Solvent Oil 21	gal.	.24	.29
C-42	gal.	.30	.35
Wilcor Reclaiming Oil No. 111 (drums)	gal.	.28	.32
No. 151 (drums)	gal.	.28	.32
X-1 Resinous Oil	lb.	.0135	.02
X-60 Solvent	gal.	.22	.30

REINFORCING AGENTS—CARBON BLACK

Channel, Hard Processing (HPC) (bags)

Atlantic HPC-98	lb.	.0682	.112
Continental F	lb.	.0682	.1125
Croflex	lb.	.0682	.1125
Crow	lb.	.0682	.1125
Dixiedensed (and S)	lb.	.0682	.1125
Huber HX	lb.	.0682	.1150
Kosmobile (and S)	lb.	.0682	.1125
Kosmos T	lb.	.0682	.1125
Micronex HPC	lb.	.0682	.1125
Spheron 4	lb.	.0682	.112
Witco Disperso No. 6	lb.	.0682	.1125

Channel, Medium Processing (MPC) (bags)

Atlantic MPC-95	lb.	.0682	.112
Continental A	lb.	.0682	.1150
Croflex TH	lb.	.0682	.1125
Dixie R-1	lb.	.0682	.1125
Dixiedensed HM (and S-66)	lb.	.0682	.1125
Huber TX	lb.	.0682	.1150
Kosmobile HM (and S-66, SMG)	lb.	.0682	.1125
Kosmos M	lb.	.0682	.1125
Micronex Standard	lb.	.0682	.1125
Spheron 6	lb.	.0682	.112
Witco Disperso No. 1	lb.	.0682	.1125

Channel, Easy Processing (EPC) (bags)

Atlantic EPC E-42	lb.	.0682	.112
Continental AA	lb.	.0682	.1125
Croflex 77	lb.	.0682	.1125
Dixiedensed 77	lb.	.0682	.1125
Kosmobile 77	lb.	.0682	.1125
Micronex W-6	lb.	.0682	.1125
Spheron 9	lb.	.0682	.112
Witco Disperso No. 12	lb.	.0682	.1125
Wyex	lb.	.0682	.115

Channel, Conductive (CC) (bags)

Dixie 5	lb.	.0740	.1175
Kosmink	lb.	.0740	.1175
Spheron C	lb.	.08	.12½
I	lb.	.066	.111
N	lb.	.18½	.25
Voltex	lb.	.15	.18½

Furnace, High Elongation (HEF) (bags)

Sterling K	lb.	.05	.09

Furnace, High Modulus (HMF) (bags)

Continex HMF	lb.	.05	.09
Dixie 40	lb.	.05	.09
Kosmos 40	lb.	.05	.09
Modulex	lb.	.05	.09
Philblack A	lb.	.05	.06
Statex 93	lb.	.05	.09
Sterling L	lb.	.05	.09

Furnace, Semi-Reinforcing (SRF) (bags)

Continex SRF	lb.	.03½	.07½
Dixie 20	lb.	.03½	.07½

Furnace, Semi-Reinforcing (Cont'd)

Essex	lb.	.03½	.07½
Furnex	lb.	.03½	.07½
Gastex	lb.	.03½	.06½
Kosmos 20	lb.	.03½	.07½
Pelletex	lb.	.03½	.06½
Seminex	lb.	.03½	.05½
Sterling R	lb.	.03½	.07½
Sterling S	lb.	.03½	.07¼

Furnace, Fine (FF) (bags)

Statex B	lb.	.05¾	.09¾

Furnace, High Abrasion (HAF) (bags)

Philblack O	lb.	.07	.08

Thermal, Fine (FT) (bags)

P-33 (c.l.)	lb.	——	.05

Thermal, Medium (MT) (bags)

Thermax (c.l.)	lb.	——	.03

REINFORCING AGENTS—MISCELLANEOUS

Darex Copolymer No. 3	lb.	.39½	.42
No. X34	lb.	.39½	.42
Darex Copolymer Latex No. 3 (and X34)	lb.	.36½	.50
Durez 12687 (and 12707)	lb.	——	.32
Durez 13355	lb.	——	.26
Marbon B	lb.	.65	.75
S and S-1	lb.	.41	.48
Marmix	gal.	1.16	1.35
Naftex EPC	lb.	.084	.1025
HMF	lb.	.068	.09
MPC	lb.	.084	.1025
SRF	lb.	.058	.075
Pliolite S6 Resin	lb.	.41	.42
G Masterbatch	lb.	.40	.41
G50 Masterbatch	lb.	.40	.41
R Masterbatch	lb.	.43	.44
Wilcorite R Resins	lb.	.29	.35

RETARDERS

ESEN	lb.	.34	.39
Retardex	lb.	——	.51

RUBBER SUBSTITUTES

Mineral Rubber

38	ton	26.00	32.50
Black Diamond	ton	26.00	27.50
Byerlyte	ton	42.50	57.50
Gilsonite, Selects (c.l.)	ton	33.50	34.50
Hard Hydrocarbon (dms.)	ton	40.00	42.00
Herron Flake	ton	38.50	40.00
Mineral Rubber, Granulated	ton	30.00	35.00
Solid	ton	27.00	32.00
Parmr (drums)	ton	26.00	30.00
Pioneer	ton	33.00	60.00

Vulcanized Vegetable Oils (Factice)

Amberex	lb.	.27	.38
Brown	lb.	.18	.38
Dispersed	lb.	.28	.49
Neophax	lb.	.20	.38
White	lb.	.13	.39

Miscellaneous Rubber Substitutes

Gilsowax	lb.	.04½	.05
Insulac	lb.	.06	.06½
Resin No. 1098 (drums)	lb.	——	.65
No. 1198	lb.	.31	.35
Wilmex M-4 (and M-6)	lb.	.05½	.06

SOLVENTS

Acetone (dlvd.)	lb.	.07½	.10
American Dipentene	gal.	.45	.46
Amsco Lactol Spirits (t.c.)	gal.	——	.14
Rubber Solvent (t.c.)	gal.	——	.13½
Solv A (t.c.)	gal.	——	.18½
Solv B (t.c.)	gal.	——	.22½
Special Napthalite (t.c.)	gal.	——	.13½
Textile Spirits (t.c.)	gal.	——	.14
Amyl Chlorides, Mixed (l.c.l.) (drums)	lb.	——	.08
Benzol 90%	gal.	.17	.24
Butyl Acetate (t.c.)	lb.	——	.305
Butyl Alcohol (t.c.)	lb.	——	.305
Secondary (dlvd.)	lb.	.10½	.11½
Tertiary (dlvd.)	lb.	.12	.14
Carbon Bisulfide, Tech	lb.	.05	.08
Carbon Tetrachloride	gal.	——	.80
Cosol 1	gal.	.26	.34
Cosol 2	gal.	.25	.33
Cyclohexane	lb.	.08	.10
Cyclohexanone	lb.	.25	.27 a
Diacetone, Pure (dlvd.)	lb.	.12	.14½
Dichlorethyl Ether (dms.)	lb.	.16	.17
Formal (dms.)	lb.	.26	.27

HERMANN WEBER & CO., Inc.
76 BEAVER STREET
NEW YORK 5, N. Y.

CONTINENTAL MACHINERY CO.
261 BROADWAY - - NEW YORK 7, N. Y.

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Designers and Manufacturers of

RUBBER PLANT EQUIPMENT

- All types of Rubber Machinery and Plant Equipment for every requirement of Large and Small Factories.
- Complete Plant Design and Layout; also Special Machinery Developed and Manufactured.
- Specialists in Latex Equipment.
- Complete Laboratory Facilities for Chemical and Product Development and Research.
- Technicians Furnished for Factory Design and Operation in all countries.

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ROGER WILSON & CO., LTD. Speaking Tile Walk, Birmingham 13, England

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Red Iron Oxides
Green Chromium Oxides
Green Chromium Hydroxides

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HEEL WASHERS
Flat and Conical
- Lowest competitive prices
- Proven performance

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148 Hawkins Street Derby, Conn.

RMP for RED RUBBER

ANTIMONY
- ATTRACTIVE
- NON-DETERIORATING

RARE METAL PRODUCTS CO.
ATGLEN, PA.

SOFTENERS and PLASTICIZERS
For RUBBER
From the Pine Tree

ROSIN OIL
PINE TAR
BURGUNDY PITCH
GALEX a non-oxidizing RESIN
Send for "Pine Tree Products" *Booklet*

NATIONAL ROSIN OIL PRODUCTS, Inc.
R. K. O. BUILDING, RADIO CITY, NEW YORK 20, N. Y.
Plant: Savannah, Ga. Branches in Principal Cities
"PIONEERS OF THE INDUSTRY"

SOLVENTS (Cont'd)

Dichloropentane (l.c.l.)	lb.	—	.04½
Dipentene 122 (dms.)	gal.	—	.51
Ethyl Alcohol (t.c.)	gal.	—	.96
Ethylene Dichloride (drums, dlvd.)	lb.	.08	.09½
Halowax Oil	lb.	.27	.30
Heptanes (t.c.)	gal.	—	.15
Hexalin Cyclohexanol	lb.	.20	.22
Hexanes (t.c.)	gal.	—	.15⅜
Isopropyl Alcohol, Ref. 99% (dlvd.)	gal.	.45	.57½
Ether, Ref. (dlvd.)	lb.	.04½	.06½
Mesityl Oxide (dlvd.)	lb.	.11½	.14
Methanol (dms., dlvd.)	gal.	.41	.56½
Methyl Acetone, Syn. (drums, dlvd.)	gal.	.46	.52
Methyl n-Amyl Ketone (drums)	lb.	.37	.39
Methyl Ethyl Ketone	lb.	.10½	.12½
Methyl Isobutyl Ketone (dlvd.)	lb.	.13½	.15½
N-5 Pentane Mix. (t.c.)	gal.	—	.06½
N-6 Hexanes (t.c.)	gal.	—	.11¾
N-7 Heptanes (t.c.)	gal.	—	.10½
Petrolene (t.c.)	gal.	—	.10⅛
Picolines, Alpha, Refined	lb.	.30	.34
Mixed	lb.	—	.30
Pyridine, Refined	lb.	.65	.69
Quinoline	lb.	.43	.52
Rubber Solvent (t.c.)	gal.	—	.12½
Rubsol (t.c.)	gal.	—	.08625
Skellysolve B (Hexanes) (t.c.)	gal.	—	.141
C (Heptanes) (t.c.)	gal.	—	.133
E (Octanes) (t.c.)	gal.	—	.155
R (Solvent Naphtha)	gal.	—	.109
Solvenol	gal.	—	.51
Solvent, Crude, Light	gal.	.19	.28
Solvesso 100 (t.c.)	gal.	—	.2812
150 (t.c.)	gal.	—	.2812
Sunny South Dipentene	gal.	.45	.46
Toluene (drums)	gal.	—	.28
Toluol (t.c.)	gal.	—	.23
Trichlorethane	lb.	.11	.12
Triglycol Dichloride (dms.)	lb.	—	.49
Tromex	lb.	.078	.083
X-7 Sp. Heptanes (t.c.)	gal.	—	.10
X-8-A Solvent Naphtha	gal.	—	.07¾
Xylene (drums)	gal.	—	.28

STABILIZING AGENTS (for Vinyl Resins)

Dutch Boy DS-207	lb.	—	.48
Plumb-O-Sil A	lb.	—	.26
Tribase	lb.	—	.22¼
Eagle Basic Silicate White Lead	lb.	.18½	.19¾
Lead Stearate, Precip.	lb.	.55	.57
Fused	lb.	.60	.62
Stabelan A	lb.	.55	.65
Stabilizer No. 1	lb.	1.55	2.05
Stabilizer No. 32	lb.	.75	1.15
Stabilizer V-7939	lb.	—	.60
Stabilizer JCX	lb.	—	.45
SN	lb.	.36	.42
V-1-N	lb.	.44	.50
V-9	lb.	—	.85
Vanstay	lb.	.33	.35

SUN CHECKING AGENTS

Antisol	lb.	.23	.24
Heliozone (dlvd.)	lb.	.23	.24
Sunproof	lb.	.23	.28
Jr.	lb.	.17	.22
Tonox	lb.	.50	.59

TACKIFIERS

Advaresin 100	lb.	.13½	.14
Agchem RC 30	gal.	.65	1.34
Amberol ST-137X	lb.	.33	.33½
Beckopol 1400 (dlvd.)	lb.	.25	.25½
Dutrex 44	gal.	—	.919
E-310 Resin Emulsion	lb.	—	.14
Galex	lb.	.13¾	.25
Koresin	lb.	.46	.58
Lindol Emulsion (drums)	lb.	—	.38
Liquid Rubber Flux	lb.	—	.125
Pentacizer 344	lb.	—	.20
Pentalyn Resins (dlvd.)	lb.	.19½	.22½
Resin V	lb.	—	.23¾
Rubtack	lb.	—	.12
Staybelite Esters (dlvd.)	lb.	.19½	.22½
Super-Beckacite No. 1001 (dlvd.)	lb.	.42	.42½
Wilcorite R-30	lb.	—	.40

THICKENERS (FOR LATEX)

Acrysol GS	lb.	.14½	.22
Betanol (drums)	lb.	—	.70
Emulsorex No. 5	lb.	—	.35
Propylene Laurate (dms.)	lb.	—	.36
Sodium Silicate	lb.	.01	.02

VULCANIZING AGENTS

Selenium

Vandex	lb.	—	2.00

Sulfur

Crystex (l.c.l.)	lb.	.27	.30
Dispersed Sulfur	lb.	—	.09
No. 2	lb.	.10	.15
Devil (c.l.)	cwt.	—	1.35
Insoluble Sulfur 60	lb.	—	.16
Star (c.l.)	cwt.	—	1.85
Tire	cwt.	1.50	2.00
Tube (c.l., dlvd.)	cwt.	2.00	2.60

Tellurium

Latex Telloy	lb.	—	2.00
Telloy	lb.	—	2.00

Miscellaneous Vulcanizing Agents

VA-3	lb.	.55	.65
Vultac No. 1	lb.	.38	.45
No. 2	lb.	.38	.45
No. 3	lb.	.42	.49

WASHING & FINISHING AGENTS

Apcolene (t.c.)	gal.	—	.09⅝

WETTING AGENTS

Advawet No. 15	lb.	—	.18
No. 33	lb.	.40	.43
Aerosol OT 70% Clear	lb.	.80	1.00
Agchem SA-15 (16, 18)	lb.	.17	.29
Alrosol (dms.)	gal.	—	.48
Aquarex ME (dlvd.)	lb.	—	.92
NNS (dlvd.)	lb.	—	.60
NS (dlvd.)	lb.	—	.75
Areskap 50	lb.	.30	.38
Dry 100	lb.	.60	.72
Aresket 240	lb.	.30	.38
Dry 300	lb.	.60	.72
Aresklene 375	lb.	.42	.57
Dry 400	lb.	.70	.84
Lecithin	lb.	—	.22
Santomerse D	lb.	.43	.65
S	lb.	.13	.25
Sorbit P	lb.	—	.28
Stablex G	lb.	—	.70
Triton K-60	lb.	.33½	.41
N-100	lb.	.59½	.67
R-100	lb.	.14½	.25
720	lb.	.30½	.38
770	lb.	.21¾	.29¼
Vultamol	lb.	—	.17½

MISCELLANEOUS CHEMICALS

Acto 450 (550-W, 600, 630)	lb.	.109	.145
Agchem SA-17	lb.	—	.29
Aquarex SMO (dlvd.)	lb.	—	.50
A.S.T.M. Oil No. 1 (and No. 3)	gal.	1.00	1.25
Black Shield 4701	lb.	—	.21
Copper Inhibitor X-872-L	lb.	—	1.50
2-Ethylhexanol (dms., dlvd.)	lb.	.25	.26
Glycerine, 88% Sap., Crude (dlvd.)	lb.	.35½	.36
Hydrozo	lb.	—	.51
MODX (tons)	lb.	—	.29½
Para Resin No. 1784	lb.	—	.09¾
No. 2457 (c.l.)	lb.	—	.04
No. 2718 (c.l.)	lb.	—	.04
pHR	lb.	—	2.00
Pigmented Filmite	lb.	—	.16½
Resin No. 1226	lb.	.31½	.36½
Resorcinol (dlvd.)	lb.	—	.64
Rio Resin	lb.	.48	.50
Santocel	lb.	—	.50
Serictic, PA No. 400	lb.	.02	.03
Sublac	lb.	.31	.34
Synpep N (drums)	lb.	—	.54
Thiokol LP-2	lb.	.85	.95
LP-3	lb.	.85	.95
Tysonite	lb.	.21½	.22¼
Vanfre	gal.	2.00	2.50
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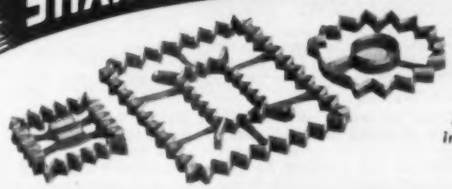

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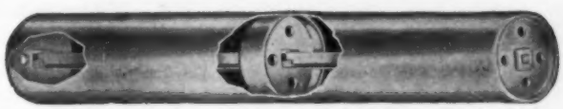

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RUBBER CHEMIST: B.S., 34, married, 12 years experience in research, development, compounding, and technical service in rubber and rubber-like plastics; and in development and evaluation of chemicals for sale to rubber and plastics industries. Prefer midwest or west coast. Address Box No. 2671, RUBBER AGE.

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HELP WANTED

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HELP WANTED (Cont.)

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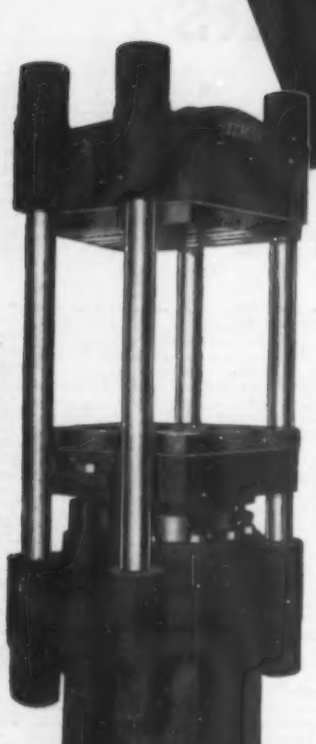

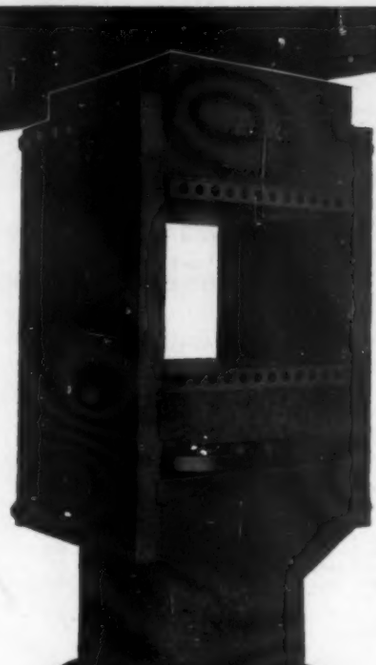

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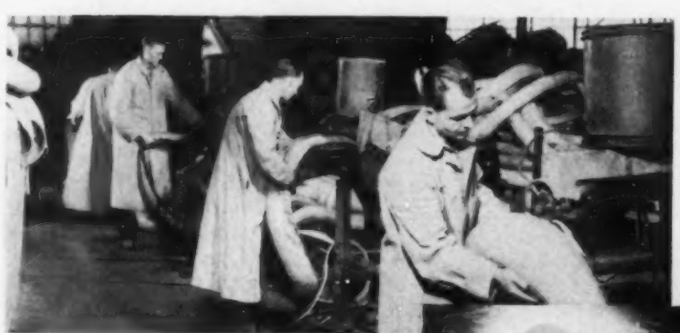

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